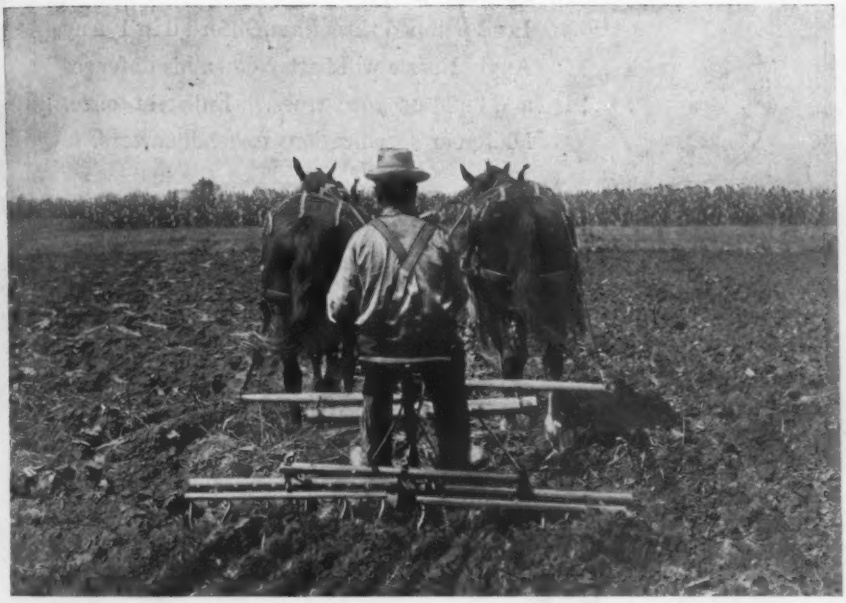
VOL. XIII. NO. 7 1916 PRICE 25 CENTS

THE CORNELL COUNTRYMAN



A P R I L

THERE IS MONEY IN GREENHOUSE CUCUMBERS

YOU can grow a Fall and A Spring crop, or one of Tomatoes and one of Cucumbers, and arrange it so that you have a complete rotation, and practically no idle ground except the short off-crop time in the summer.

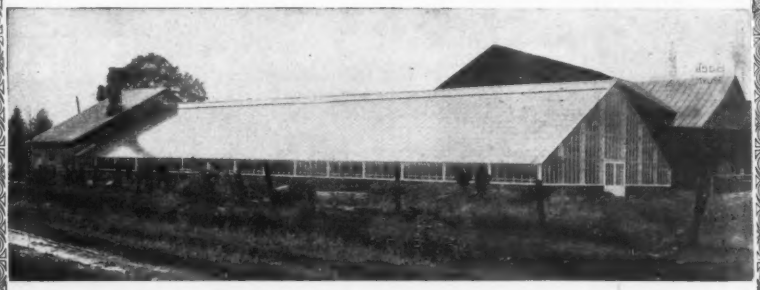
Right now, greenhouse cucumbers are being shipped from the Mississippi Valley section of the West, to New York and San Francisco.

The market hasn't begun to be supplied.

One man who formed a stock company and built five of our big houses, netted a good profit the first year, and has steadily increased it ever since.

Of course, growing cucumbers requires skill—its not exactly "finding money."

You put up the money and we'll put up the houses. You can hire a skilled grower; and with you on the job to look after things; it will be your own fault if your bank balance doesn't grow. Don't hesitate to write for any information. Do it **freely.**



Lord & Burnham Co.

SALES OFFICES

CHICAGO, Rookery Bldg. ROCHESTER, Granite Bldg. CLEVELAND, Swetland Bldg.
NEW YORK, 42nd St. Bldg. BOSTON, Tremont Bldg. PHILADELPHIA, Franklin Bank Bldg.
TORONTO, Royal Bank Bldg. MONTREAL, Transportation Bldg.

FACTORIES

IRVINGTON, N. Y. DES PLAINES, ILL. ST. CATHARINES, Canada

O. K'd Every Hour Day and Night By Chemists

WHETHER the user of Portland Cement makes his own private tests or not, it must be a source of satisfaction to him to know that all the ALPHA Cement that comes to him has been tested hourly by chemists who are men of real authority in every ALPHA plant.

Under the ALPHA system of supervision, all cement must be correctly proportioned as to raw material, thoroughly burned, and ground to exceed standard specifications, it is impossible for for any ALPHA Cement shipped out to lack proper binding power.

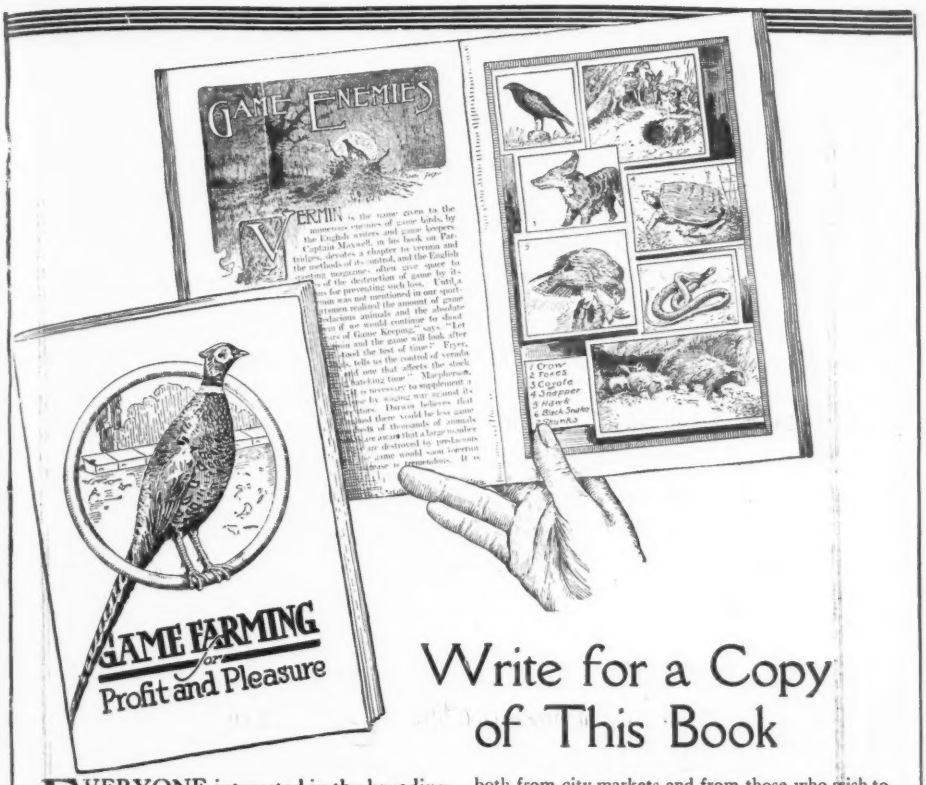
Every bag of ALPHA Cement is guaranteed to more than meet the U. S. Government standard and every other recognized test.

Six great plants on six trunk-line railroads, one plant with its private docks directly on the Hudson River. Capacity 25,000 barrels daily.

Ask for Art Envelope A, containing views of distinctive concrete constructions, and for the 80-page illustrated handbook, "ALPHA Cement—How to Use It."

ALPHA PORTLAND CEMENT CO., GENERAL OFFICES: **EASTON, PA.**

Branch Offices: New York, Philadelphia, Boston, Pittsburg, Baltimore, Savannah



Write for a Copy of This Book

EVERYONE interested in the breeding of game birds should write for a copy of the book, "Game Farming for Profit and Pleasure. It is sent free to those who ask for it.

"Game Farming for Profit and Pleasure" is a carefully edited and profusely illustrated manual on the breeding of game birds. It describes in detail the habits, foods and enemies of wild turkeys, pheasants, grouse, quail, wild ducks and related species. It tells of the best methods for rearing. It discusses the questions of marketing and hunting.

The breeding of game birds is profitable and pleasant for many reasons. The demand for birds, both from city markets and from those who wish to raise game is much greater than the supply. There is also a continuous call for eggs by breeders.

Furthermore the birds you raise will afford you good sport in hunting, and also food for your table. If you own large acreage, you may lease the privilege of shooting over your land to those who will gladly pay for it.

If you cannot raise game yourself we will try to put you in touch with those who will raise it for you to shoot.

The more game raised the more good hunting there will be for you and the more often you will enjoy game on your table.

But the book tells the whole story. You will find it most interesting reading. Write for your copy today. Use the coupon below.

Game Breeding Department, Room 36

HERCULES POWDER CO.

Wilmington, Delaware

Manufacturers of Explosives; Infallible and "E. C." Smokeless Shotgun Powders; L. & R. Orange Extra Black Sporting Powder; Dynamite for Farming.

Game Breeding Department, Room 36
Hercules Powder Company, Wilmington, Delaware

Gentlemen:—Please send me a copy of Game Farming for Profit and Pleasure. I am interested in game breeding from the standpoint of

Name_____

_____

Very truly yours,

Address _____

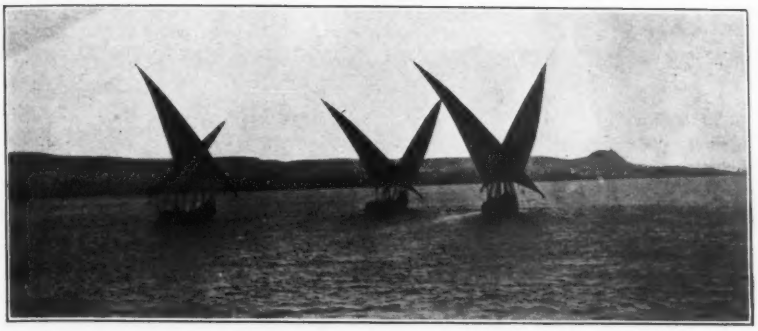
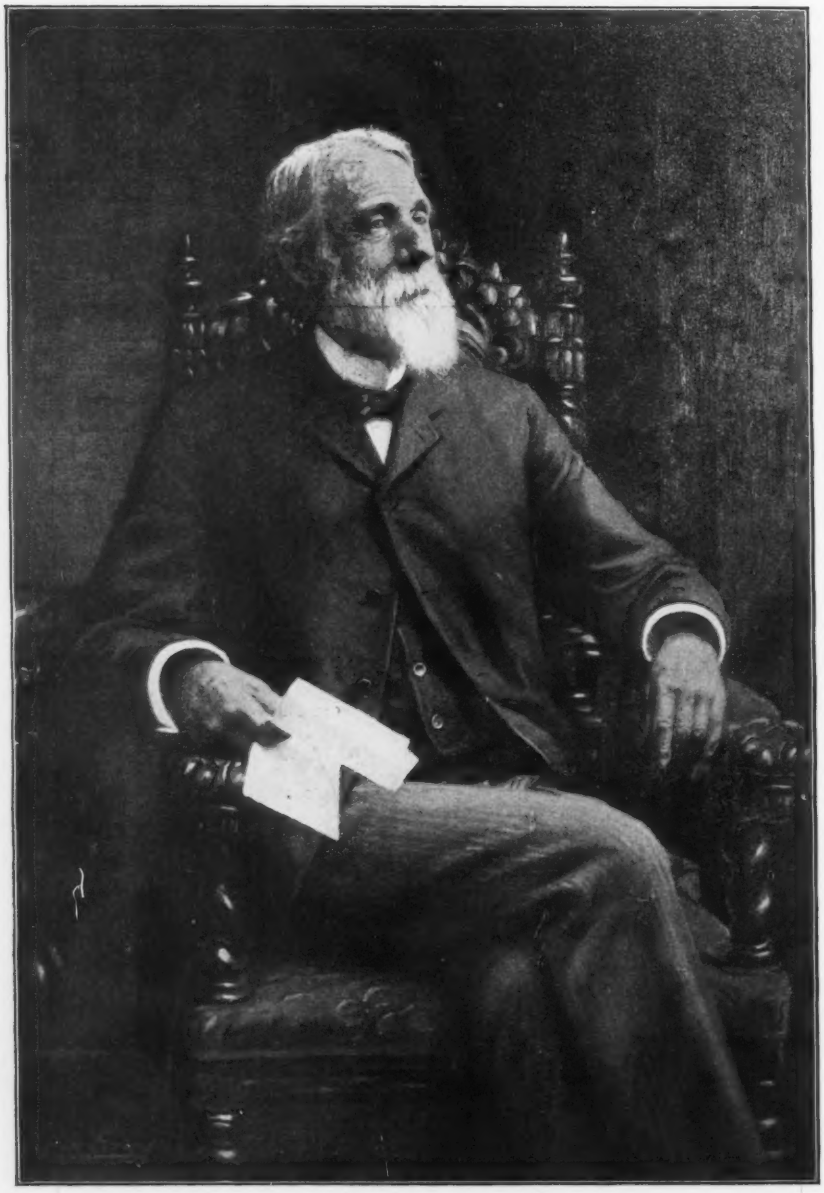


TABLE OF CONTENTS

APRIL 1916



ISAAC PHILLIPS ROBERTS, PIONEER

His recently published biography is reviewed on page 592 of this issue

THE CORNELL COUNTRYMAN

Vol. XIII ITHACA, N. Y., APRIL, 1916 No. 7

The Commercial Growing of Plants and Flowers in New York State

BY E. A. WHITE

Professor of Floriculture, New York State College of Agriculture at Cornell University

The production of ornamental plants and cut flowers is an industry that has always centered around the more densely populated sections, and therefore the states having the largest number of large cities lead in this industry. New York State holds the first place in this respect. As estimated in the census of 1910, her annual production of flowers and plants was valued at $5,110,221. There were 1398 growers who reported an income of more than $250 on glasshouse products of ornamental plants and flowers. The plants were grown in an area of 13,876,857 square feet of glass. Other states foremost in flower production are: Pennsylvania, the value of whose products is $3,760,644; Illinois, $3,680,973; New Jersey, $2,839,319; and Massachusetts, $2,432,000.

In New York State the industry centers about New York City. Other large cities are so distributed over the state, however, that the business is not wholly localized in that section, as is the case in states having but one or two large cities. Rochester has the distinction of being called the "Flower City of the United States," while Buffalo, Syracuse, Utica, Albany, and several other cities produce and dispose of large quantities of flowers and plants.

Rochester has a great number of greenhouse establishments, but few large ranges. The growers raise varied products, and there is but little attempt toward specialization in any particular crop. Certain growers, however, produce some special crops better than they do others. Among the larger producers are J. B. Keller's Sons, who have approximately 30,000 square feet of glass area; H. E. Wilson, who has 100,000 square feet; Ellwanger and Barry, with 50,000 square feet; Vick & Hall Company, with 25,000 square feet. Other prominent flower producers are George J. Keller, Henry P. Neun, Schlegel's Sons, and Hugo Leute.

Buffalo has fewer growers in its immediate vicinity than has Rochester, due evidently to the fact that climatic conditions there are unfavorable, there being many cloudy days. Sunshine is a powerful factor, especially in the production of cut flowers; and unless there is an abundance of sunshine, the work of raising flowers proves discouraging. The largest range of glass near Buffalo is that of W. J. Palmer & Son. It is located at Lancaster, about ten miles from the center of the city. The glasshouses cover approximately 300,000 square feet of ground area. Miscellaneous plants are largely grown in these houses to supply the firm's retail flower shops, but

plants for cut flowers, such as roses and carnations, are also grown in considerable quantities.

In Syracuse the largest establishment is that of P. R. Quinlan & Co., whose greenhouses cover approximately 100,000 square feet. Bannister Brothers, Bond & Davis, Bartholme, and Bellamy Brothers, are among other important florists.

The present tendency among flower and plant producers is toward specialization. An important limiting factor in specialization is the character of the soil. The ability of an individual to produce some one crop better than any other, is also an important factor.

The soil factor has been largely responsible for localizing violet production about Rhinebeck and that section of the Hudson River valley. A few growers made so pronounced a success of the business that it was entered into by a large number of men in that vicinity, many of whom had had little or no experience in flower growing. There are no large greenhouses devoted to this crop, but there are approximately eighty-five growers who have ranges covering from one to three thousand square feet; the majority of the houses cover an area averaging approximately two thousand square feet. Only double violets are grown and these are shipped to all parts of the State, especially to western New York, where violet growing is not successful. The violets are shipped also to other states.

Rose growing has become a specialized industry. The cultural demands of the crop are somewhat peculiar. The plants require soil and sunlight conditions that are found only in certain sections of the country. The *American Beauty* roses are especially difficult to grow unless there is maximum sunlight, which is essential to produce a clear, rich tint. If the variety is grown in inferior soil, the growth will be weak and the stems short and spindling. If there is a lack of sunlight, the petals will be purple in color, thus diminishing the value of the variety for cut flowers. The largest grower of *American Beauty* roses in the State is Paul M. Pierson, of Scarborough and Briarcliff. The Briarcliff establishment is a large one and the greenhouses are of modern construction. The output of *American Beauty* roses from this range supplies a large number of New York flower stores and is of an excellent quality. F. R. Pierson, of Scarborough, also grows this variety, but not so extensively. The majority of *American Beauty* rose growers, however, are located in northern New Jersey and eastern Pennsylvania, where excellent light conditions, combined with good soil and marketing facilities, make the crop a remunerative one.

Among the largest growers of tea and hybrid tea roses may be mentioned F. R. Pierson, at Scarborough. Mr. Pierson has a modern range of approximately 300,000 square feet of glass devoted exclusively to roses. There are few other establishments in the State where the crop so nearly approaches perfection. While a large number of varieties are grown, the principal ones are *Ophelia, Mrs. Francis Scott Key, White Killarney, Killarney Queen, Lady Hillington,* and *Richmond.* Many of the smaller cluster roses, such as *Cecile Brunner,* are also grown in large quantities. Other large establishments in the State are the Lake View Rose Garden, at Jamestown, and the United States Cut Flower Company at Elmira.

Carnation growing is more generally distributed over the State, but the industry is considerably localized in the eastern section of Long Island. Carnations thrive best in a medium light soil and in a section where the climate in summer is comparatively cool. These conditions are found on Long Island, and excellent carnations have for many years been produced there. In fact, it was on Long Island that the first carnations were grown in America. The firm of Dailledouze, Zeller & Gard, at Flatbush which is now the firm of Dailledouze Brothers, was among the first to grow carnations in America. This was about 1858. The firm now has approximately 100,000 square feet of glass and grows

some of the finest carnations sent into the New York market. Among other large carnation growers on Long Island are the Cottage Gardens Company, at Queens, and James Cockcroft, at Northport, Long Island.

Orchid specialists are not numerous in New York State. The New York market is supplied with orchids largely from growers located in northern New Jersey. There are also comparatively few sweet pea specialists in the State.

Within a comparatively few years there has been a revival of interest in the growing of potted plants. These were at one time the principal product in glasshouses, but with improved construction and methods of culture the cut-flower business became more important. A well-grown potted plant is a thing of beauty and admiration, but a poorly grown one is of little value. A few men in New York have seen the value of these plants from the commercial viewpoint and have aimed to produce them to perfection. The demand for potted plants is greatest at Christmas and at Easter, but a well-grown flowering plant will sell at almost any season of the year. Buyers often prefer a potted plant to cut flowers because as a rule they have better keeping qualities.

The potted flowering plants most generally grown are azaleas, cyclamen, primroses, ericas, or heaths, hydrangeas, genistas, calceolarias, cinerarias, begonias, and Easter lilies and other bulbous plants. One of the largest specialists in growing these types of plants is Antoine Schulthesis, of College Point, who has approximately 60,000 square feet of glass area devoted to their production. Mr. Schulthesis grows a larger number of ericas than of other species. His range, however, has very well-grown representatives of most species of potted plants. Louis Duprey, of Whitestone, is another large grower, and his remarkable plants have won many prizes at flower exhibitions.

There are no establishments in New York where palms and other exotics are grown on a large scale, and the New York market is supplied largely by Connecticut, New Jersey, and Pennsylvania. F. R. Pierson, of Tarrytown, however, makes a specialty of growing ferns of the Nephrolepis type, and his greenhouses are filled with many varieties, from the coarse-fronded *Boston* type to the finely divided *elegantissima*. They are in all stages of development, from the newly formed runner to the splendidly finished specimen plant.

Plant and flower production in New York is an important industry and the business is developing rapidly. Market conditions are prosperous, and it is many years since the florists have been as optimistic as at the present time. The demand is good and prices are high. Conditions in Europe are such that there is a lessened production there of azaleas, bulbs, and other plants which in years past glutted the market, especially in the spring.

"NOW
WELL - APPAREL'D APRIL ON
THE HEEL OF LIMPING WINTER
TREADS."

—Shakespeare

Water Supply Systems for the Farm Home

BY HOWARD W. RILEY '01

Professor of Rural Engineering, New York State College of Agriculture at Cornell University

THE water supply system which has for man the least operating cost is the great pumping system of nature in which the sun does the elevating, the clouds act as storage tanks, and cold winds come to open the discharge faucets. The more directly the farmer can utilize the assistance of nature the greater will be the comfort which he can take in his supply system and the greater will be the economy of operation. Conversely, the more artificial the system, the greater are the troubles of operation and the greater the cost of maintenance.

Considered from the foregoing point of view, water systems may be divided into three classes, (1) natural, (2) semi-mechanical and (3) mechanical, the determining factor in any case being the level at which the water coming from the clouds is secured as a stored or flowing supply from which it is to be delivered by pipes to the house.

Before undertaking a discussion of the different systems we must pause for a moment to consider a few factors affecting the flow of water in pipes. Water will flow through a pipe whenever the pressure behind it is greater than that in front. Driving pressure may be secured by the weight of water in a higher pipe, in which case the force is that of gravity; it may come directly from the end of a pump piston; or it may come from the expansive force of compressed air acting on the surface of the water. Of these three sources of pressure the height or "head" of water is the most common and has become the recognized standard for measuring pressures. The real driving force, however, is the pressure on the water that is measured in pounds per square inch. A column of water one foot high will produce a pressure at its base of 0.434 pounds per square inch, or there will be required a column of water 2.30 feet in height to produce at its base a pressure equal to one pound per square inch. This rate of pressure is produced by a stationary column of any size from one inch to one mile in diameter. It is independent of the size of the pipe provided the water is not moving.

As soon as water finds the pressure ahead less than that behind, it begins to move and at once some of the available pressure or head is used up in getting the water in motion. The energy thus used in producing velocity can be measured in feet of pressure head and is known as the "velocity head." Again, as the water passes from a large reservoir into a pipe it crowds at the entrance thus using up more enegry. This energy is known as the "entry head" or "loss of head in feet due to orifice of influx." After getting itself into the pipe and up to a reasonable velocity of travel the water finds itself retarded by the friction on the sides of the pipe. The longer the pipe and the faster the water flows the greater is the friction until presently the retarding effect of the friction is sufficient to prevent further increase in velocity. As the amount of frictional resistance increases directly with the length of pipe it is usually referred to as "loss of head in feet due to friction per 100 (or 1000) feet of pipe" or "friction head per 100 feet of pipe." The smaller the pipe or the rougher the inside surface, the greater is the friction loss, the general expression for this loss, as given by Prof. E. W. Schoder, of the College of Civil Engineering at Cornell, being $H = KV^n \div d^m$ in which H is the friction head per 100 feet of pipe; K, a constant; V, the

velocity in feet per second; n, an exponent nearly equal to 2 (about 1.90); d, the inside diameter of the pipe in feet; and m, an exponent not much over unity (about 1.25). The value of K, n, and m vary for different kinds of pipe, and V must be taken for a considerable range of velocities, so it is evident that the computation of friction losses in pipes is too complex an operation to be undertaken by the individual who had better get the desired figures from a book of tables. These tables will also give the velocity head and the entry head for any condition, but for farm systems these two losses are so small as to be negligible, the friction head being the important item.

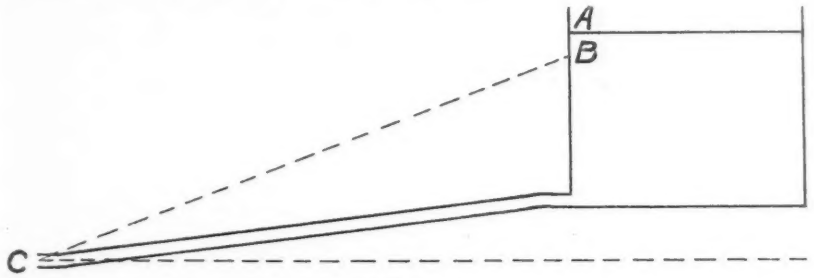


FIG. 1

One more term of hydraulics should be briefly defined before we go on to water systems, and that is the term, "hydraulic grade line." Assume that we make a drawing accurately to scale of the side view of a water reservoir and a discharge pipe leading diagonally downward from the bottom of one side as shown in Fig. 1. A horizontal line is drawn from C, the center of the outlet of the pipe, under the reservoir. The vertical distance from this horizontal line to the water level A, in the reservoir, is a measure of the total head available above the outlet of the pipe. If water flows freely from the pipe, part of this total head would be lost as velocity and entry heads, so these might be taken from tables and marked off to scale as the point B on the side of the reservoir below the water level A, and directly over the upper opening of the pipe. If now we draw a straight line from the point B to the center of the outlet of the pipe, we will have in the line BC the "hydraulic grade line." We may define it as a line which, by its distance above the horizontal, shows graphically to scale the number of feet of head still remaining in the pipe at that point as pressure head above the outlet C. If the size or character of the pipe change, if it have sudden turns to add friction, or if constricting valves or fittings are introduced in its length, the "hydraulic grade line" will not be a straight line but will drop sharply at points to show the loss of head due to these obstructions as illustrated in Fig. 2.

We may now take up in detail the classification of water systems as given at the beginning of this article.

Natural Systems

Natural systems are those in which the water will flow by force of gravity alone from a reservoir at a high level to a point of utilization at a lower level.

Direct gravity systems are those in which the delivery pipe follows in general, a continuously downward direction. It may follow the contour of the ground and, in the descent to the farm buildings, may pass under intervening valleys of any depth, or over obstructing knolls on which the pipe line does not rise to a level higher than that of the "hydraulic grade line" defined above.

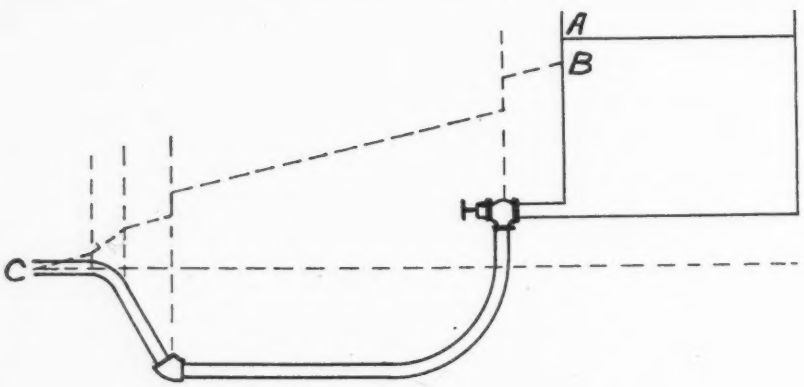


FIG. 2

The pipe may rise somewhat above this grade line and still continue to deliver water, but there will be siphon action at this point which would throw the system into the next classification and, what is more important, cause it to be subject at this point to the troubles of a siphon system.

In order to find the free discharge capacity of a given length of a given size of pipe with a known supply head, find first the average fall per 100 feet of pipe; then, disregarding all losses except that of friction, find from the tables the velocity of flow in this pipe which will develop a friction head in 100 feet equal to the available fall per 100 feet. For this velocity the tables will give the flow from the pipe in gallons per minute and in gallons per 24 hours. If it is desired to reserve a certain part of the total head for use at the lower end of the pipe, as for power purposes or to give rapid discharge through faucets, the amount of head thus reserved should be subtracted from the total head before the average head available for overcoming friction is determined per 100 feet of pipe. For households, about five feet of head available at the highest faucet will give sufficient velocity of delivery, while for power purposes as little head must be lost in friction as is consistent with the cost of the larger pipe used to avoid friction.

Siphon gravity systems are direct gravity systems in which the delivery pipe rises above the hydraulic grade line. The amount of this rise should be as little as possible and should in no case exceed twenty feet as indicated for pipes A or B in Fig. 3. The reason for this is that in the pipe above the hydraulic gradient the pressure is less than atmospheric pressure, and as a consequence minute air globules are released from the water and accumulate at the top of the siphon forming a mechanical obstruction in the pipe which sooner or later will entirely stop the flow of water in it. All siphon systems should be provided at their high points with accumulation chambers opening from the top of the pipe in which these air bubbles may collect without hindering the flow. The chamber must be air-tight and valves should be provided at each end of the pipe line so that the chamber may at any time be easily emptied of air by filling it with water.

Artesian wells are essentially gravity systems because their flow is produced by a head of water coming from a direct gravity system flowing through a natural water tight passage under ground, instead of through a manufactured pipe. Where it is possible to restrain the pressure of artesian wells they are often made to deliver water through pipes to considerable heights.

Semi-mechanical Systems

Semi-mechanical systems are those in which the power of falling water is utilized in a suitable machine for elevating a smaller volume of water to a level higher than that from which the operating water originally came.

Hydraulic rams, the operation of which was described in the January number of the *Cornell Countryman,* are the best known devices for this type of service. For operation there should be available three to fifteen feet of fall and a supply of not less than two or three gallons per minute. The greatest delivery height for simple rams is ten times the amount of fall, while for larger, more expensive rams it can be as much as twenty-five times the fall. The amount of water delivered will vary from one-fourth to one-twentieth of the supply, depending on the conditions.

Water wheels driving pumps make a type of system to be preferred in some instances to the hydraulic ram. The conditon under which they are most likely to show superiority over the ram is in the case where it is desired to use the fall of dirty water to raise clean spring water without the least possibility of the two being mixed. The type giving the greatest efficiency is the steel bucket overshot wheel which is now manufactured in small farm sizes by several different firms.

The hydro-pulsator is a machine resembling somewhat a hydraulic ram and a reaction turbine. The action is essentially that of the ram with the exception that the driving column of water is never brought to a complete stop as in the ram. With this machine water may be raised from a level lower than that at which water wastes from the pulsator, a characteristic which would make this device capable of using a limited supply of irrigation water falling through quite a drop from an irrigation ditch and by this means pumping an auxiliary irrigation supply from a well. So far as we know, the machine has never been made in this country. It is described in the files of the "Stevens Indicator" to be found in the Sibley Library.

(*This article will be continued in the May issue.—Ed.*)

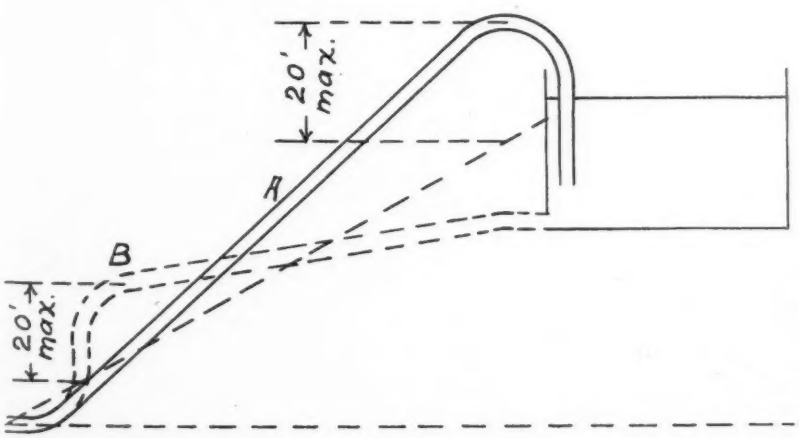


FIG. 3

The Soils and Agricultural Development of Northern New York *

Article No. 8

BY ELMER O. FIPPIN

Professor of Soil Technology, New York State College of Agriculture at Cornell University

NORTHERN New York includes roughly all that part of the state north of the Mohawk drainage. It embraces all of eight large counties and a considerable part of six other counties on the southern side that belong mostly to more southern divisions of the State already described in this series of articles.

The total area of the region is approximately 14,500 square miles or one-third of the state, of which about 3,350 square miles are improved, and the remaining 77 per cent are unimproved and forest land. It is the "north country," so-called by some of its enthusiasts residents.

The region divides into three main sections, namely the Adirondack Mountains proper, the central mass, and the valley or plains region that roughly form the east and west sides of the boundary triangle, namely, the Champlain Valley on the east and the lowlands around the east end of Lake Ontario and through the St. Lawrence Valley on the west. These two lowland regions join across the northern flank of the mountain section on a low ridge.

The topography is that of a great central mountainous dome reaching an elevation of more than five thousand feet, ironed out on its edges to form low plains only two or three hundred feet above sea level. Even these latter are more or less wrinkled and irregular so that the true plains areas are generally of small extent and are almost extensively developed in central Jefferson County, along the lower course of the St. Lawrence River and in small pocketed areas along the lower course of the St. Lawrence River and along the shore of Lake Champlain.

The drainage radiates out from the mountain area in a series of rivers, the largest of which are the Black, the Saranac, Ausable and the head waters of Oswagatchie, Grass, Raquette, Salmon, of the Hudson River. These waters find their way out in tortuous channels and then a succession of falls which develop a potential water power in this region greater than all the remainder of the State combined. The last line of falls on these rivers marks the location of the chief cities of the region such as Watertown, Gouverneur, Canton, Potsdam, Malone and Glens Falls. These cities in turn are not far from marking the division between the tilled agricultural lands on the lower side and the rough and mostly untilled lands on the higher side of the region. Ogdensburg and Plattsburg are water ports.

Geology. Geologically, this region includes the oldest part of the State, the central mountain dome being composed of plutonic rocks, mostly granite and norite, that are of Pre-cambrian Age. The slow emergence of this dome above sea level is marked by a succession of rock strata that lie in sloping folds around its flanks on all sides. Some of these have been more completely removed than others. Around the north edge is the very siliceous Potsdam Sandstones that form a wide exposure. Beyond this is a succession of limestones,

* This is the eighth article in a series entitled "An Agricultural Survey of New York State." The series will be continued in an early issue.—Ed.

the Trenton through the St. Lawrence Valley, and the Beekmantown and Chazy on the upper end of Lake Champlain. On the southern side there are also small exposures of limestone in Saratoga County and in northern Oneida and Lewis Counties. Lapping on these latter are the Hudson River Shales and Sandstones most extensively developed in southern Lewis County.

A SCENE IN THE ADIRONDACK DISTRICT
Typical mountain topography largely covered by lumber

This rock structure is deeply eroded to form a very rough topography that has been toned down by the subsequent incursion of glacial ice that deeply covered the entire area. The great diversity in elevation caused large deflection in the ice currents. The hardness of the rocks resisted abrasion and have developed large areas of very stony soil as well as much rough stony land with little or no soil covering. Subsequently the drainage from the melting ice settled in the hollows to form great rivers, extensive lake plains and numerous swamps and small lakes.

The ten or more important series of soils recognized reflect these different influences.

General agricultural conditions of the mountain region. All the central mountain mass is essentially non-agricultural. The Plutonic rock with their surface plained off by the ice lie uncovered over large areas on the exposed side. The deep valleys and protected coves are deeply filled with coarse siliceous sand often thickly strewn with boulders and occasionally finished with a thin yellowish brown stony silty loam soil. The till portion of this belongs to the Gloucester Series. The sandy stream terraces mostly of low agricultural value are of the Merrimack Series. In a few places, these soils with occasional narrow ribbons of first bottom are cleared and farmed to supply the summer tourist population of the region because of the great difficulty of getting in supplies. Only abnormal prices will justify the tillage of this land. Lakes, ponds and swamps abound in the hollows formed by the unequal filling of the valleys.

Lowland soil conditions. The northern and western flank up to an elevation of six or eight hundred feet bears a succession of glacial till soils related to the rocks of the region.

Across the north front from Clinton County to St. Lawrence County, the Potsdam Sandstone gives rise to the

Coloma Series. For the most part the soils are thin and very stony, the rock being the local sandstone. Tilled areas are small and irregular in sheltered patches. It is a slightly reddish brown silty to sandy loam soil resting on a grayish subsoil. The surface is undulating to broken and reaches up to an elevation of 1500 feet. The drainage is uneven and the content of humus is low.

A GROUP OF FARM BUILDINGS IN NORTHERN FRANKLIN COUNTY
The land is made up of Ontario soils and the buildings are above the average

This series forms the broad divide on the Canadian line between the Champlain line between the Champlain and St. Lawrence drainage.

In northern New York the Coloma Series is preeminently identified with the production of potatoes, especially in Clinton and Franklin Counties. The sandy loam is dominant, and when coupled with the climate that prevails makes the cool but active soil conditions most favorable to yield and quality in the potato. Two or three hundred bushels is the common yield.

Beyond the Coloma Series at a lower elevation are the Calcarious Series that vary in different sections according to the supplementary rock introduced with the limestone.

In Clinton and Saratoga Counties, where sandstone and granite occur, it is the Dover Series, grading over into the Mohawk Series in the latter area. Generally it is a rather stony dark gray till of loam to sandy loam texture with a compact subsoil. The soil has a dark brown color varying with the content of humus. It forms fairly large areas of smooth farm land and is generally the site of excellent farms.

On the west side of the region the Ontario and Farmingdale Series embrace the Calcarious till in southern Jefferson, northern Lewis and the west central part of St. Lawrence Counties. It also reaches into the northern part of Franklin County. The Ontario Series is dominant. The loam and silt loam types, prevail with more or less stone, but usually not in very troublesome amounts. The rolling slopes of the Ontario Series are smooth enough for general farming. The brown to gray finable soil grades into a rather compact gray sandy till. Trees thrive on this soil. Drainage is often deficient.

The Farmingdale Series best seen southeast of Watertown is a light brown loose finable soil and subsoil, rather thin and semi-residual from the underlying limestone.

All these Calcarious soils are fairly well supplied with lime, especially in the subsoil, and generally produce clover with fairly good success. They are very productive soils.

On the southwest flank in Lewis County and the adjacent regions the Hudson River Shales and Sandstones have given rise under glaciation to the Worth Series related to the Dutchess and Volusia Series in southern New York. The types range from clay loam to heavy standy loam usually containing a good many sandstone boulders. In eastern Oswego County, the red material of the Medina Formation imparts a pinkish tinge to some of the soil.

The country is hilly and, owing to a deficiency in lime, is low in productiveness because of a lack of humus. Most of the land including that which has been formed is now untilled.

sandy, gravelly beaches that mark the limit of the lake. The high velocity of the stream brought down coarse sand and gravel that came to rest in these deltas in successive courses as the flow of the stream was checked. The coarse material forms great semi-barren plains well exemplified below Carthage, Governour, in the vicinity of Malone, back of Plattsburg, in the sand plains back of Glens Falls and in northern Saratoga County.

As the finer sediments floated out into the deeper water of the lake, finer and better soils were formed. These heavy soils form extensive plains areas in Jefferson County and along the St. Law-

TYPICAL FARM BUILDINGS AND TOPOGRAPHY IN ST. LAWRENCE DISTRICT

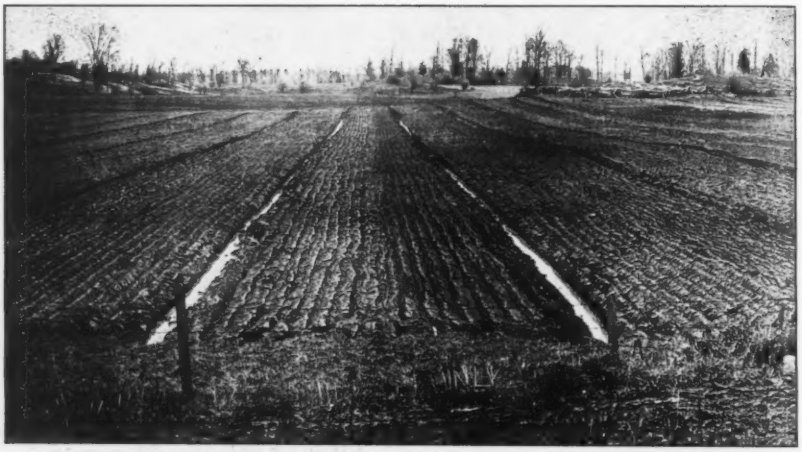
Note the areas of heavy clay soils cut by rock outcrops

Lake and terrace soils. Probably the most extensive series of tillable soils in northern New York is the Vergennes. The lake conditions that prevailed through the St. Lawrence and Champlain Valleys up to an elevation of about two hundred feet above the present water surface inundated the low stretches of country. The streams from the ice and from the mountainous part of the region discharged out into this succession of lakes and formed a series of great sand and gravel delta plains at their mouths. These were partially reworked into

rence River for a distance of several miles out from its east bank. They are also the main feature of the soils through the Lake Champlain Valley. Beginning with the sandy loams and running through the successive textures, the agricultural value of the material increases until the heavy clay is reached far off the shore in which the naturally defective drainage cuts down its crop value.

The greater part of this lake country is occupied by heavy silt and clay loam soil, often with a heavy clay subsoil. For the most part, the surface of these

heavy soils is nearly flat. However many rock masses extended up into the lake waters and either have no deposit or only a thin covering. They give a roll to the surface or cut the tillable soil into irregular pocketed areas. This condition is most extensively developed in northern Jefferson and southern St. Lawrence Counties.



TYPICAL POORLY DRAINED LAND IN NORTHERN NEW YORK
The large areas of clay soil are usually plowed in narrow lands to afford surface drainage

The sandy and gravelly deltas and beaches have small agricultural value. The clay plains are troubled with wetness. This latter, coupled with short seasons, makes a serious handicap in the production of tilled crops and contributes to the large development of hay crops in the region.

The soil is a dark gray to brownish gray color with a rusty brown subsoil. The latter is compact and generally quite Calcarious below two or three feet.

General agricultural conditions. As a whole, northern New York is not intensively developed. Its suitability for hay and forage has led to the large development of dairying. Watertown has the largest butter and cheese exchange in the country. Market milk is collected throughout the length of both the Champlain and St. Lawrence Valleys for New York City.

The tilled areas are largely confined to the edge of the region, the central area being a great forest region, a large part of which is owned by the state. Much of the forest area has been cut over and is growing up in an indifferent way. Waste land occurs in large amounts throughout, due to stony soil, rough topography and wet land.

The most extensive sale crop from the clay soil is hay. Corn is better grown for silage than for grain because of the cool summers and short season. Oats is the prevailing grain crop and some barley is also grown. In northern Franklin and Clinton Counties potatoes are the leading money crop and, as noted above, are associated with the Coloma sandy soils.

Certain varieties of apples, particularly the Snow and the Esopus, are proving very successful on the eastern side of the area on the Dover soils both in Clinton and Saratoga County.

Around Malone, hops have been extensively grown on the Dover soils, but like those in central New York, are being

forced out by disease and by western competition.

In the line of improvement, better drainage of the soil is believed to be for the most pressing need. The extent of heavy soil, the short season and the poorly distributed rainfall lead to this conclusion. There is also a need of lime. The coarse sandy and gravelly soils should be devoted to forestry. As a whole the region should receive in a broad and public way of the best principles of modern forestry. The petty policy of tieing up the State forest areas as game preserves and tourists play grounds for the people who need these least, coupled with the waste of the timber product that might better be utilized, is an instance of short-sighted selfishness that a less progressive commonwealth might well blush to own.

Legume Inoculation

Extension Work of the Laboratory of Plant Physiology

BY LEWIS KNUDSON,

Assistant Professor of Botany, New York State College of Agriculture at Cornell University

IT is now approximately thirty years since the artificial inoculation of leguminous crops was first practiced, but up to 1905 the use of pure cultures for legume inoculation had been slight. This previous disinclination on the part of the farmer to use pure cultures for legume inoculation has been due in part to the lack of information upon the part of the farmer and to the discrediting of the idea of legume inoculation with pure cultures because of the failure of these cultures to produce the desired results. Within the past ten years, however, effective cultures of legume bacteria have been put on the market. That the use of these has greatly increased is evident from the fact that last year the sales of one company was reported to have reached a value of nearly one million dollars.

The increase in the use of cultures for legume inoculation has been stimulated by the increasing emphasis placed upon the utilization of leguminous crops, the teachings of agricultural institutions with respect to inoculation, and the nation-wide propaganda of those commercial organizations engaged in the exploitation of legume cultures. Much information has been disseminated in this way, though some of it has been misleading. There is still, however, on the part of farmers in general a lack of knowledge respecting legume inoculation. For the primary purpose of educating the farmer to the value of legume inoculation, as well as to acquaint him with the limitations of the practice, the Laboratory of Plant Physiology has for the past four years distributed in limited quantity pure cultures of these bacteria. The educational value of this work is founded upon the fact that the farmer is enabled at slight expense and little effort to gain first hand knowledge respecting the relation of bacteria to nodule formation, and in many cases is able to discover by experimental means the value of these nodules to the plant.

While the primary object of this work is educational in nature, yet other purposes enter into the distribution of these cultures. By making available to the farmer the legume bacteria cultures at a nominal cost, he is encouraged to practice inoculation particularly when exerimenting with a new legume crop. The immediate results of a practical nature obtained from this distribution of cultures have been the successful growing of crops which otherwise might have resulted in failure. Finally, the results secured by the practice of inoculation are reported

to the college so that in time there will be available a considerable body of data relative to the necessity and value of inoculation in New York State for the different leguminous crops.

The work of the Laboratory of Plant Physiology in the preparation of these cultures was begun in 1910 when an investigation was initiated with the idea of securing a satisfactory medium for the propagation of these bacteria. It appeared at that time that the pure cultures then available to the farmer were not entirely satisfactory. It was believed that the artificial media used were not quite suitable to the organism. As a result of a rather extended investigation it was finally decided to use sterilized sand for the propagation of the legume bacteria.

The form of cultures as now distributed was then adopted as being the most effective means for distributing the bacteria. The cultures in brief are prepared as follows: The bacterial organism is first isolated from a given species of legume. It is then propagated in test tubes on a nutrient agar medium and then the organisms from each test tube culture are sown in a can holding two pounds of sterilized sand. In the course of a few days the bacteria have multiplied so rapidly that a single gram of the soil may contain from 50 to 200 millions of bacteria. The writer has estimated that such a culture used for the inoculation of alfalfa sufficient for one acre, will contain approximately 6000 organisms for each alfalfa seed.

The method of inoculation recoming. The contents of the can is added to a quart or more of water and the water and sand poured over the seed to be inoculated. The seeds are then turned over until each individual grain is moistened. The sand and water coming into contact with the seeds impart to the seed some of the legume bacteria which adhering to the seed are carried with it into the soil. The organisms getting into the soil undoubtedly multiply, and as soon as the roots appear, contact of some of the organisms is made with the roots and the infection is then secured which results in nodule formation.

The main advantage of the sand cultures over other pure cultures is the increased viability of the bacteria and the entire lack of danger of injuring the culture. The cultures can be kept for at least a year without losing their effectiveness. Data obtained indicate that cultures two and three years old are still capable of inducing nodule formation. By yielding some colloidal materials and by its abrasive qualities the sand undoubtedly makes possible an increase in the number of organisms which become attached to the seed.

The distribution of cultures during the season of 1915 was as follows:

Alfalfa	3445
Alsike clover	173
Crimson clover	55
Red clover	838
Sweet clover	155
Field bean	557
Garden bean	23
Soy bean	394
Canada field pea	696
Cowpea	142
Spring vetch	66
Winter vetch	747
Total	7291

The cultures were sent to approximately 1900 individuals, while during 1914 the number receiving cultures was approximately 1200 with a total of 5,045 cultures. The facilities of the laboratory have not thus far permitted of a greater distribution of cultures although it is expected to increase the work during the coming season.

Results of a noteworthy, beneficial character have been secured with the cultures for alfalfa, vetches, soy bean, sweet clover and field pea. The first four are relatively new crops for New York and, as expected, the organisms necessary for nodule production in these crops are not generally present in New York soils. With the field pea the influence of inoculation has been marked

in the cases where the crop has been grown for the first time. Beneficial results have been repeatedly reported from the inoculation of red clover, but the clovers have been so generally grown in New York State that inoculation for these crops is not to be recommended.

The greatest demand has been made for cultures of alfalfa and, as indicated in the accompanying figure, the interest in the growth of alfalfa is wide-spread. It is yet too early to report on the success of the alfalfa trials throughout the State. In the limestone area of the State alfalfa is being grown successfully and the reports now at hand indicate a high degree of success in regions outside of the limestone soils. In any case successful growth of alfalfa is absolutely dependent upon nodule production on the roots. There is no doubt about this and since the organism for causing nodule formation on alfalfa is not generally present in New York soils, artificial inoculation is essential to success. Of course the proper soil conditions must be provided.

DISTRIBUTION OF ALFALFA CULTURES IN NEW YORK STATE

In conclusion mention should be made of the active interest and cooperation of the various farm bureau agents. It is in a large part through the active support and oversight of these men that many of the inoculation tests have been made and it is largely their judgment based on their observations and experiments that will decide for any particular locality the need for inoculation for any particular crop.

Coal-Tar Products Versus Carbolic Acid as Disinfectants

BY A. H. ZENNER, Detroit, Michigan

ACCORDING to Webster, a disinfectant is an agent for removing the causes of infection. It is a conceded fact that infection is caused by disease germs; therefore, in order to be a true disinfectant, a substance must kill or destroy disease germs.

A few years ago the only well-known disinfectant was carbolic acid, and this came to be used very generally when a disinfectant was required. The term *carbolic acid* is employed in a lax way, as the acid is used in many strengths. The laity run great risk of using it either too strong or too weak, so that the results are not always dependable or satisfactory. Carbolic acid is probably responsible for more deaths by accident and suicide than any other drug, and it is always dangerous to use and handle. The greater part of the supply comes from Germany, and under present war conditions the price has reached $2 a pint.

Some years ago science took a hand to find what residue there was after carbolic acid had been distilled from crude oil. Experiments led to the discovery of the so-called coal-tar disinfectants, such as "zenoleum", "greso", and several others, and it was found that these were much greater in germicidal value than carbolic acid. In order to determine their germicidal value, it was decided to compare them with carbolic acid. This gave rise to the "carbolic coefficient," which means, for example, that if a disinfectant has a carbolic coefficient of three, it has three times the germicidal value of pure carbolic acid.

A disinfectant with three times the value of carbolic acid will perform the same work when diluted three times as will the same amount of *undiluted* carbolic acid. It was found that these coal-tar disinfectants could be manufactured at a much less cost than carbolic acid; the retail selling price on the two products named is $1.50 a gallon. It was found also, after repeated experiments, that the coal-tar disinfectants were not dangerous to handle. They are absolute disinfectants, and when properly diluted will kill the most resistant disease germ, by contact, in one minute. The typhoid fever germ was used for this test.

Coal-tar disinfectants not only will prevent disease, but in many instances will cure it. They will kill lice, mites and parasites, and cure skin diseases.

Compare the cost of pure carbolic acid at $16 a gallon, and the cost of one gallon of coal-tar disinfectant at $1.50. The coal-tar disinfectant has three times the germicidal value of carbolic acid; therefore it would take $48 worth of carbolic acid to do the same work that $1.50 worth of coal-tar disinfectant will do.

There are many products used as disinfectants which have little germicidal value. One of these is kerosene. It sells for fifteen cents a gallon and is used pure. The coal-tar disinfectants are to be mixed with 100 gallons of water; no boiling is required, and at $1.50 a gallon the cost of the diluted liquid would therefore be about one and one-half cents a gallon.

In choosing a coal-tar disinfectant, be sure to select one that is standardized, that is, always of the same coefficient. The Government requires that the contents of the package be on the label, and no variation from this rule is allowed. One can readily see, therefore, that the purchase of a trade-marked coal-tar disinfectant has the guarantee of the manufacturer and also of the United States Government. This is another strong point in favor of coal-tar disinfectants.

To sum up, the coal-tar disinfectants are cheaper, in many cases better, and safer to use, than carbolic acid, kerosene, and many so-called disinfectants that are not disinfectants at all.

The Man on the Land on the Other Side of the World*

BY BEVERLY T. GALLOWAY

Dean New York State College of Agriculture at Cornell University

VI. THE CROPS OF CEYLON

LYING, as it does, close to the equator, with an area in cultivation equal to about one-third that of the State of New York, the island of Ceylon offers an interesting study in tropical agriculture. Tropical agriculture differs in many respects from the ordinary farming practiced in temperate regions. The crops grown in the Tropics are mostly long-lived, and their cultivation partakes more of the nature of gardening than do the usual farming operations. Labor as a rule is cheap; hence it is practicable to do many things by hand which could not be done by machinery even if labor were not available. Double cropping, and even quadruple cropping, is frequently practiced, but this is made possible only by heavy rainfall, great activity of soil organisms, cheap labor, and comparatively cheap means of soil fertilization.

The island is shaped somewhat like a pear, with the stem end pointing toward the southern extremity of India, from which it is separated by only a short distance. The waters between India and Ceylon are very shallow, and trains are soon to run, if they are not already running, straight through from points in India to points in Ceylon. The engineering work here is similar to that on our Florida Keys, where a passenger for Cuba is carried most of the way by rail.

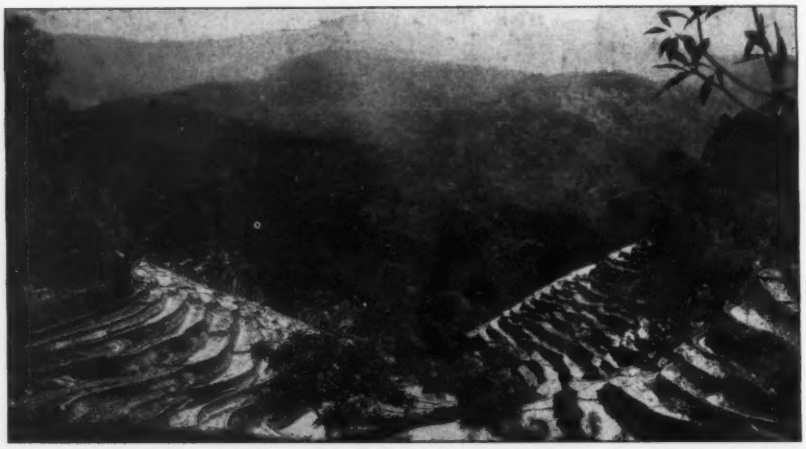
The principal crops of the island are rice, coconuts, and tea. Of the first, there are between 600,000 and 700,000 acres under cultivation; of the second, something like 800,000 acres; and of the third, between 300,000 and 400,000 acres. Rice is grown in Ceylon on both the hill and the flat lands. In the hills are to be seen some of the most wonderful of the terracing operations to be found in any country. These terraces are of all ages and have been used by primitive people in many countries for the cultivation of crops. The hillsides, running up sometimes for a thousand feet, are terraced by hand labor. The terraces follow the contour of the land, and in many cases they are only a few feet wide. By this method the land is leveled so that water may be readily applied. Rice growing is about the same in all these countries, involving much hand labor from seedtime to harvest. In Ceylon the growing of rice crops is practically continuous. Harvesting with the sickle may be in progress in one field, while in an adjoining field hand planting of individual plants or sowing of the seed may be going on.

There are many superstitions connected with the production of rice—superstitions affecting the time of planting, the time of harvesting, the character of the seed, methods of threshing, and other allied matters. A writer, speaking of these superstitions, says:

> The farmer presents himself before the village wise man or astrologer on a Monday or Wednesday, with an offering of betel nuts, and expresses his wishes in a humble attitude. The wise man then informs his petitioner, after certain astrological calculations, upon what the success or failure of his undertakings depends. The farmer must then go out with his face turned toward the proper direction as indicated by the astrologer. Should the farmer on this journey encounter sights or sounds which portend fail-

* This is the sixth of a series of articles on farming in foreign lands. The first article appeared in the October number of the COUNTRYMAN—Ed.

ure, such as the cry of an owl, the growling of a dog, the sight of persons carrying weapons, he immediately turns back, as the portents are against him. If, when he goes out, he should meet a cow, men dressed in white, or women or children carrying vessels filled with water, it is a good omen, and he may then proceed with his planting.



THE CROPS OF CEYLON

Rice culture in the hills is carried on upon terraced fields

Ceylon does not produce sufficient rice for her own needs, but must import large quantities from India. The threshing and cleaning of the rice is carried on in the most primitive way, the work being done by flails and by the old-fashioned method of using cattle to tread out the grain.

To the dweller in the Tropics the coconut is food, shelter, clothing and drink. There is no other plant in the world like it in this respect. Nearly every villager has a coconut palm or two. The open lands along the coast produce coconut trees in great abundance as a result of washed-up nuts, so that there are nearly always enough trees to furnish food for the natives. The large coconut plantations are owned by the English and the Dutch and are found chiefly in the lowlands.

Statistics as to the quantity of nuts produced on the island are not available. There are many billions of them, however, from which coconut oil, copra, desiccated coconut, coir, arrack, and other materials are obtained. Coconut oil enters largely into the manufacture of soaps, candles, and the like. Copra is the dried flesh of the coconut pressed into cakes for convenience in shipping; after the oil is pressed from the coconut there is a very useful residue known as poonac, which is used for cattle food. Coir is the material made from the long fibers of the husk, and is used extensively in the manufacture of brushes, mats, heavy ropes, and the like. Arrack is the fermented juice of the coconut and is strongly intoxicating. The young and tender leaves of the tree are used as a vegetable, and there is also made from the juice a kind of sugar which is very much in demand among the natives.

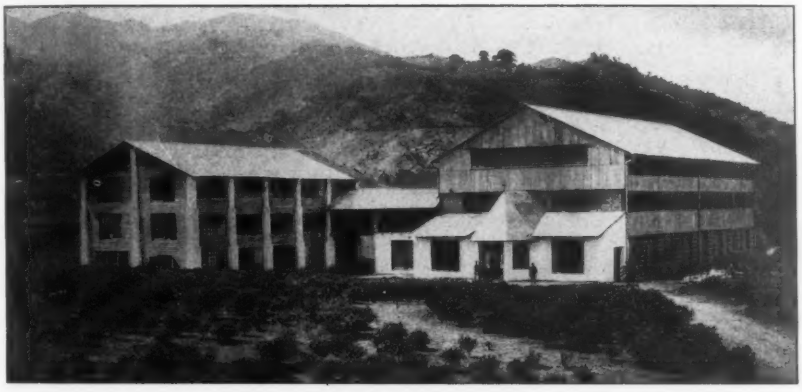
On the lower levels about Colombo and extending back for twenty or twenty-five miles may be seen large plantations of coconuts, and growing under the coconut trees are young rubber trees. Growing under the rubber and the coconut trees may occasionally be seen tea plants, with still other crops, such as plantains, arrowroot, and the like, inter-

mingled with the tea. Thus there is a mixed garden cultivation which at first sight appears to be more or less of a jungle.

Tea and Ceylon have become almost synonymous. The great tea plantations are found in the higher parts of the island. Leaving Colombo in the level country, one travels for twenty-five or thirty miles, and then the railroad begins to ascend a steep grade. The ascent is through wonderful tropical scenery, and after one or two hours of heavy climbing the train reaches Kandy, which is the center of one of the large tea districts. The hill and mountain sides about Kandy are covered with tea plants, which are kept rather closely pruned in order to facilitate picking. From Kandy to Nuwara Eliya, a distance of from seventy to one hundred miles, there is a very steep ascent. Kandy is only about 1600 feet above sea level, while Nuwara Eliya is at an elevation of nearly 8000 feet. All the region between these two points constitutes the great tea center of the island. Most of the tea estates are very large and are under the control of the English. Labor is cheap and consists mostly of coolies, who work for from 15 to 25 cents a day. The plucking, sorting, fermenting, curing, and general preparation of the tea is a rather elaborate process, requiring large, well-organized forces and good factory facilities.

The tea growers of Ceylon have made very rapid advances in the manufacture of their product. Many labor-saving machines have been introduced, eliminating a great deal of work formerly done by hand. Furthermore, these labor-saving machines have made it practicable to do the work much more cleanly than formerly. The general practice of making the tea is the same here as in other parts of the world. The leaf when gathered is brought into the central factory, and if it is to be made into green tea it is first wilted so as to make it flaccid. Then it is put into a roller and rolled for half an hour or longer. This rolling produces certain physical and chemical changes in the leaf which enable the fermenting agencies to act promptly. The large roll that comes out of the roller is broken up and the material is put immediately into the dryer so as to check all of the oxidizing ferments. The only difference between green tea and black tea is that green tea is not allowed to ferment, while black tea is permitted to ferment for a considerable time. Oolong tea is an intermediate form between black and green. The sorting, cleaning, and packing of tea are tedious processes, but

(Continued on page 620)



THE CROPS OF CEYLON
Tea plantations and tea factories

Bean Growing in Western New York

Results of a Bean Survey of Ontario County Made in 1915

BY F. W. LATHROP '14, Instructor in Agriculture, Canandaigua Academy

THIS survey in one of New York's most prosperous counties and one which is well known for the specialty it makes of growing beans was made in the summer of 1915, but the data secured for the records was taken on 1914 crops. With but few exceptions all the information contained in this survey was taken from farms in Ontario County. Nearly all of the survey work was done in four sections, namely, Bristol Valley, Middle Cheshire and West Lake Roads, Bloomfield and Rochester Roads, Reeds Corners and Rushville.

The Culture of Beans

The common practice of growing beans in these sections is to plant them on land which was in sod the previous fall and was plowed up either in the fall or in the early spring before planting. Of forty growers visited, thirty-one planted on sod land, six planted after the land had been used for corn, two planted their beans in the orchard and one planted after the land had been covered with quack grass. In many instances the plowing was delayed until one to three weeks before planting time. Growers apply manure to the land either during the winter or in the spring and they usually cover only the spots which are most barren. The spring tooth harrow and the roller were the only "fitting" tools used by twenty-five of the forty growers. The seed is never treated to prevent anthracnose or bacteriosis because no effective seed treatment has yet been devised. Formalin treatment was tested but it was ineffective. Although the seed is often cleaned and handpicked no real selection is practiced. The writer found only one grower who had a seed patch. The amount of seed differs with the variety; for kidneys the amount is usually six pecks, for contract beans, marrows and yellow eyes five pecks, and for pea beans three and one-half to four pecks.

The beans are drilled in twenty-eight-inch rows. An eleven-tooth drill with a seven-inch spacing, for example, is used with the second, sixth and tenth tubes open. The wheel mark serves as a guide. Commercial fertilizer is sown by the drill at time of planting. Thirty-five of the growers used either manure, or fertilizer, or both. The seed is drilled to a depth of two inches. The time of planting varies with the season as is shown in Table 1 which gives an idea of the general practice in 1914.

Table 1

	Time of planting 1914		
Date	June 1-10	11-20	21-30
No. growers	8	26	6

Usually the middle of June is bean planting time. Too early planting results in poor germination and uneven maturing of pods which is a serious matter. A weeder is rarely used after the plants are up.

Twenty-nine of the growers had two-horse cultivators which are the favorite tool for cultivation. Eighteen growers straddle every row so that they go twice between rows while eleven straddle every other row and go once between rows. Six growers use one-horse cultivators and five use both kinds. The first cultivation is deep and close to the row while the succeeding ones are shallower and not so close. Only eleven growers hoed their beans. At the last cultivation thirty-two of the growers threw the dirt toward the rows so that the bean puller would work more effectively.

Spraying is not practiced because it is difficult to effectively spray beans. Furthermore it is not profitable except

where the crop is threatened by some insect pest. Some growers could have profitably sprayed for striped flea beetle and snails during the 1915 season.

Harvesting is done with a bean puller which is made of two blades placed like the blades of a half-opened pair of shears. These blades, which are attached to a standard, cut just beneath the surface bringing two rows of beans together into one.

A team of horses will pull six to ten acres a day. The rows of pulled beans may be raked and forked into bunches or may be bunched without raking. Of the growers visited, twenty-two used a hay fork. The following table will show the dates of harvesting beans in 1914. Certain varieties like the pea beans and marrows are earlier than the kidneys and may be harvested in time to prepare the ground for wheat. Some crops of kidneys are harvested in time and some are followed by oats the next spring.

The beans are kept in the mow or in the stack until the threshers come. The usual price for threshing is seven cents per bushel, but for a small job a set price is asked. The threshed beans are then put in grain bins until it is time to sell them. Table 3 shows the

Table 2

Date of Harvesting in 1914						
Date	Sept. 10-20	21-30	Oct. 1-10	11-20	21-30	Nov. 1-10
No. of growers	5	13	12	7	2	1

rakes and eighteen did not. The horse rake was used by eighteen and the side delivery rake by eight. Most growers would use a side delivery rake if they had one. Some growers do not use a rake because it shells beans; others have figured that the saving in labor is more than the loss of beans by shelling. It is difficult to rake a thin stand of beans. Since a man can bunch beans only at the rate of one to two acres a day, harvesting in this manner is a slow process. Raking makes it possible to average three acres per day. Occasionally one meets a grower who first uses a side delivery rake and by straddling the raked row with a horse-rake bunches the beans. There are three ways of unloading at the mow: first, pitching off by hand; second, unloading with a hay fork; third, unloading with slings. Eighteen growers pitched off by hand, sixteen unloaded with slings, three used a hay fork and three combined pitching by hand and hauling distances of thirty-nine growers.

The system of marketing in common use should also be explained. All beans included in the survey, except seed beans and contract beans, were sold to produce men in Canandaigua, Rushville and Holcomb. When the beans are offered for sale the produce man takes a sample and estimates from this sample the amount of foreign material and defective beans in pounds per bushel of sixty pounds. The grower is paid according to this estimate for the good beans minus a charge for removing foreign material and defective beans. As a rule this charge is two cents per pound of material removed for kidneys, marrows and yellow eyes, while it is three cents per pound for pea beans. Contract beans are grown for seed-houses at a contract price. The pick is estimated for contract beans, but no charge is made for cleaning.

Table 3

Distance of Haul							
Miles	0-1	1.1-2	2.1-3	3.1-4	4.1-5	5.1-6	6 +
No. of Growers	4	6	9	5	8	0	7

Factors Affecting the Yield of Beans

Since the cost of production and profits depend largely on yield, an effort has been made to study carefully the factors which affect the yield. These factors are, (1) variety (2) soil (3) time of planting (4) rotation (5) preparation of the ground (6) seed (7) diseases and insects (8) fertilizers and manures (9) cultivation and (10) rainfall.

Varieties

Red kidney is the most widely grown variety. It is a good yielder when anthracnose is not prevalent and brings a higher price than other varieties. In certain localities contract beans are grown for seed houses. In this case the grower is supplied with seed which is later taken from his crop. The price of the beans is agreed upon when they are planted and no charge is made for cleaning. Black Valentine, Refugee Wax and Bountiful are the most common varieties found. The acreage of pea beans found was smaller than expected. Contrary to the general idea the average yield was found to be lower than that of the red kidney, but perhaps the small number of acres does not furnish a fair comparison. During a year when anthracnose is common, white beans will make a much better showing because they are not as susceptible to disease as the red varieties. The red marrows are similar to the red kidney in everything except they are smaller and weigh heavier to the bushel. On the thirty-three acres surveyed these beans yielded better, than the kidney variety. The yellow eye is a fair yielder which is resistant to anthracnose, but the market demand is limited. Consequently the price is never the highest. White marrow and white imperial are two promising varieties because they are anthracnose resistant and their price is usually higher than that of pea beans.

Red kidneys are found in all parts of the country where beans are raised, red marrow having the same adaptation. Most of the contract beans were found west of Canandaigua Lake on the Middle Cheshire Road. The soil there is mostly Ontario loam. Many pea beans were found north of Canandaigua on the Bloomfield Road. There the Dunkirk clay and silty clay loam are the predominating soils.

Yellow eyes are most common in the vicinity of Rushville. One field of fifty acres was observed there. The most common soil types were Ontario and Volusia loams. The following table compares the yields of the different varieties. Where the acreage of a variety is small the yield cannot be considered representative in comparing one variety with another.

Table 4

	No. of growers	No. of acres	Ave. yield in bu. per acre
Red Kidney	27	356	15.1
Contract	7	89	11.1
White Pea	7	76	14.1
Red Marrow	4	38	18.6
Yellow Eye	2	17	11.2
White Marrow	1	15	20
Total		586	

Average yield for all varieties in bushels per acre, 14.5

With the exception of red kidney beans there are not enough fields of any variety to draw conclusions as to the effect of variety on yield. The writer believes that the strain within the variety is as important as the variety in its effect on yield. There are therefore great possibilities in selecting high producing strains for seedsmen who can give time to it.

Soils

Most of the records were taken on Ontario loam. This loam type is suited to beans because of its high lime content and medium texture. There is a strip of this soil east and west across the county at about the latitude of Canandaigua. There are also strips of it part way down on both side of Canandaigua Lake. The Dunkirk types are found north of Canandaigua. They are heavier than the Ontario types with a predominance of silty clay and clay. These types have not the lime content of

the Ontario soils. On the whole they are not as good for beans.

The records taken on Genesee soils came from the Bristol Valley below Bristol Center. The types are a silt loam, a shale loam and a loam. These soils are rich, not too heavy, and may or may not have a rich lime content. Table 5 compares yields on these three soils. Only the fields were included which are on farms having one soil type since on farms having several types it is difficult to tell on which type the bean field is located because of the gradual merging of one type into another.

Table 5

Relations of Soils to Yield

	ONTARIO	DUNKIRK	GENESEE
No. Growers	15	5	4
Yield in bu. per acre	15	14.7	19

Time of Planting

The time of planting is a factor affecting the yield. Too early planting may reduce the yield materially. Bean seed does not germinate evenly or strongly below a certain temperature, consequently early planting results in a thin stand and an uneven ripening of pods. No correct time of planting can be given since it is determined by the season, the texture of the soil and the location of the field. In the description of the culture of beans the dates of planting of forty growers are given for 1914.

used with certain rotations. For example nine of the eleven men who used the rotation, hay, beans, oats, wheat, used the red kidney bean because this variety is later than the others. Many growers cannot get red kidney beans harvested early enough in the fall to sow wheat and therefore plant oats or barley in the spring. As can be seen in Table 6 there are three rotations which are most used. These are hay, beans, wheat; hay, beans, oats or barley, wheat; and hay, corn, beans, wheat. Table 6 does not give a wholly accurate comparison of rotations as to yields because growers often change rotations to fit conditions and the beans do not always come in their regular place. One of the arguments for growing beans is that it makes a very good crop to preceed wheat. The length of bean rotations may become important if the root rot, so common in Wyoming County, becomes prevalent in Ontario County. A long rotation is said to be one remedy for this disease.

Two of the growers raised beans in the orchard. These and several other farmers in this locality think that beans make an excellent orchard crop. The crop yields well, adds nitrogen to the soil and does not hurt the trees.

Preparation of the Ground

The plow, spring tooth harrow and the roller are the most frequently used

Table 6

Rotations and Yield

	No. growers	No. acres	Av. yield in bu. per acre
Hay, beans, wheat	20	317.5	13.8
Hay, beans, oats or barley, wheat	11	164	15.6
Hay, corn, beans, wheat	5	73	14.3
Hay, corn, beans, oats, wheat	1	10	20.6
Orchard	2	14.5	19.2
After quack grass	1	7	5.3

Rotations

The records for one year are not enough to judge whether one rotation is superior to another. No doubt the rotation has a relation to yield. Difference in the yield of varieties might affect the yields shown in Table 6 as well as rotations since certain varieties are

implements. The usual plowing depth is six to eight inches. Growers commonly harrow the land three to five times and roll from one to three times. The disc harrow is sometimes used and occasionally the big cultivator.

Growers plow six to eight inches for beans. It is unsatisfactory to compare

the yields of those fields plowed at different depths because of the difference in soils. Table 7 compares the yields of those who plowed six, seven and eight inches.

Table 7

Depth of Plowing and Yield			
Depth of plowing in inches	6	7	8
No. of growers	9	14	11
No. of acres	134	244	127½
Av. yield per acre in bu.	13.9	13.2	17.3

In comparing the yields of the growers plowing six and seven inches, the difference favors those who plowed six inches. Those who plowed eight inches averaged over four bushels more per acre than the growers plowing seven inches. It is safe to say that under identical soil conditions deeper plowing until the subsoil is reached will result in larger yields. Comparing depths in different fields is a more difficult matter.

The time of plowing is important. For example, if a field is plowed a week before planting and is dragged at intervals of two days and another field is plowed a month before planting and dragged the same number of times, but with longer intervals between draggings, the latter field will be in better condition to plant. Table 8 gives the yields of growers whose time of preparation varied. Note that seven of the growers practiced fall plowing and their average exceeds that of any other group.

Table 8

Days between Plowing and Planting						
No. of days	Days not known	10-20	21-30	31-40	41-50	51 +	Fall
No. of growers	8	6	5	6	4	4	7
No. of acres		88	102	71	59	87.5	97.5
Ave yield per bu. per acre		12	13.4	16.4	14	12.4	17.8

In attempting to find a relation between the amount of preparation and the yield both the number of times the ground was worked and the time spent in preparing one acre are considered. Neither plowing or drilling is considered as preparation.

Table 9 shows that the growers worked the soil from five to nine times in most cases. In considering all these tables less weight should be given to columns of figures representing a small number of growers. With this caution in mind the number of times the ground is worked has a close relation to the average yield. In studying the time required to plant an acre, horse hours are used rather than man hours; otherwise a man using two horses would have to be compared with a man using three.

Does good preparation pay? A considerable number of growers worked their fields five and nine times. Table 11 gives the average labor cost per acre which includes man, horse and machine labor, for each group and also the average yield. The average increase of cost per acre for those who worked the land nine times was $2.90 and the average increase in yield eight and four-tenths bushels.

Table 9

Effect of Preparation on Yield								
No. of times worked	4	5	6	7	8	9	10	11
No. of growers	2	9	8	7	4	7	1	2
No. acres	36	147.5	146	91	55	76.5	10	24
Ave. yield bu. per acre	15.8	12	13.4	15.2	12.8	20.4	15	19.7

Table 10

Horse hours per acre for Preparation and Yield					
Horse per acre	5-10	10.1-15	15.1	20.1-25	25.1-30
No. of growers	5	12	14	5	3
No. of acres	97	189.5	182	62	5.5
Av.yd.bu.p.acre	14.4	11.4	16.1	18.4	20

Table 11

	No. of growers	Ave. yld. bu. pr. acre	Lab. cost 1 acre, horse, man, mac.
Worked gr'nd 5 times	9	12	$2.82
" " 9 "	7	20.4	$5.72

Seed

Very little attention has been paid to the improvement of bean seed. New York bean growers might benefit by pedigree beans just as Wisconsin farmers have by pedigree barley. Although there are no figures to prove it, there is no doubt that the quality of the seed has no effect on the yield. Seed selection is important for two reasons; first, anthracnose and bacteriosis, two serious bean diseases are carried from one year to the next with the seed; second, selection of seed from high yielding plants will increase the yield. Just how much selection the average bean grower can practice profitably has not been demonstrated, but there seems to be an opportunity for men who will make a specialty of this work. The average grower has his seed cleaned at the elevator. He may clean it at home. The occasional grower cleans out runner beans from the patch where he is to get his seed. This is as far as selection goes.

Table 12

Effect of Amount of Seed on Yield. Red Kidney

Amount per acre	Growers	Acres	Av. yield
5 pecks	7	103½	16.1
6 pecks	10	135	16.4

The yields of the growers of red kidney beans who sowed five pecks of seed to the acre and those who sowed six pecks are shown in Table 12. There seems to be practically no difference in the average yield and this fact raises the question as to whether it pays to sow the extra peck. The germinating quality of the seed and the fertility of the land will always have to be considered in determining the amount.

Diseases and Insects

During some seasons diseases and insects are more important than any other factor affecting the yield. In 1915 anthracnose caused heavy losses. The disease, being in the second, disseminated very rapidly because of hot days following wet weather. A season having rainfall above the average favors anthracnose. The striped flea beetle became serious before the beans podded in 1915 and in some fields large areas were eaten almost bare. Snails began work about the same time.

Fertilizers and Manures

Seven-eighths of the growers used either fertilizers or manure. Twenty-nine used commercial fertilizers ranging in amount from forty to two hundred and fifty pounds per acre. Most of the growers used from one hundred and fifty to two hundred pounds. Seven of the growers did not know the formulas of their fertilizers, ten used a 2-8-10, nine used a mixture in which phosphorus predominated, two used a 10-8 and one used acid phosphate. In comparing the yields where a 2-8-10 was used and where a phosphorus fertilizer was used, little difference was noted, the averages being slightly in favor of the phosphorus fertilizers. This conclusion agrees with the fertilizer experiments on beans made by Professor J. L. Stone. These figures and other facts noted during the field work indicate that a large amount of potash is not necessary. Of the three fertilizer elements potash is the most plentiful in the soil. If the ground is well prepared and cultivated and contains sufficient organic matter, a large amount of potash need not be supplied

Table 13

Value of fertilizer and manure per acre	No. fertilizer or manure	1.01-1.50	1.51-2.00	2.01-2.50	2.51-3.00	3.01-3.50	3.51-4.00	4.01-4.50	4.50& above
No. of growers	5	3	4	6	7	5	3	2	5
No. of acres	50	68	42.5	79	138	77	48	24	59.5
Av. yield bu. per acre	16.7	12	13.2	15.1	13.5	15.2	18.6	21.4	11.3

in the fertilizers. A common practice is to apply barnyard manure in certain parts of the field where it is most needed. It is applied on sod in small amounts. In estimating the value of the manure used by the bean crops it is assumed that during the first year 40 per cent of the manure is used and 30, 20 and 10 per cent during successive years. Using this basis, it was found that the values of manure used varied from a load to ten loads per acre, a load being valued at one dollar.

Is the application of manures and fertilizers to the bean crop profitable?

The above table indicates that the judicious use of fertilizers is effective in increasing the yield. Eighteen of thirty-five growers used fertilizer and manure valued at $1.50 to $3.50 per acre. Note the yield of the five men who used neither fertilizers nor manure. These yields are due to good preparation, frequent cultivations, and a sufficient amount of organic matter. Two growers used lime and obtained good results. This is to be expected since the bean being a legume has a high lime requirement. It is quite probable that experiments in liming beans will give surprising results.

Cultivation

There are four reasons why Table 14 does not show more clearly the effect of cultivation on yield. First, the timeliness of cultivation with respect to both weeds and moisture may be more important than the amount. Second, cultivation by bean growers is often too deep and may decrease the yield instead of increasing it because of injury to roots. Third, in Table 14 a grower who cultivates twice between the rows is credited with two cultivations. If the beans can be cultivated by straddling every other row with a two-horse cultivator to control the weeds, two of these cultivations is worth considerably more than one double cultivation because of the better mulch which results. Fourth, the thoroughness of preparation affects the amount of cultivation necessary for the best results. Good preparation clears the soil of weed seeds.

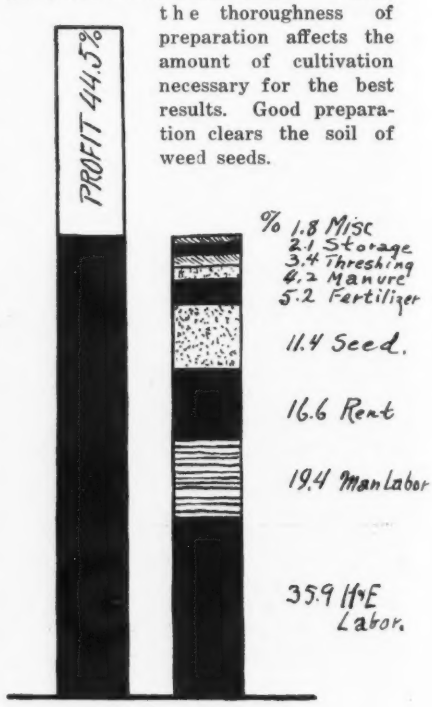


FIG. 1

Table 14

Cultivation and Yield							
Times cultivated	1.5	2	3	4	5	6	Over 6
No. growers	2	5	9	10	0	6	7
No. acres	9	71	132.5	146		109	107
Av. yield bu. per acre	18.2	17.3	11.9	13.7		12.4	19.4

Although Table 14 proves little, the writer believes that cultivation of beans is important and that shallowness and timeliness are as important as the number of cultivations.

Rainfall

Table 15

Rainfall and Yield			
	Av. yield	Av yield per bu.	Av. June-July r'fall in inches
1911, 1913 and 1914	10.1	$3.29	3.3
1909, 1910 and 1912	16.1	1.79	5.1

The figures in Table 15 are taken from an article in *The Rural New Yorker* of May 8, 1914, by M. C. Burritt showing the relation of rainfall to yield.

Figure 1 shows the relative size of the costs graphically, taking the average cost per acre as 100 per cent. The four biggest costs in order are horse and equipment labor, man labor, rent and seed. This does not agree with the common idea that the main costs in raising beans are seed and fertilizer. Since labor is such a large cost, labor efficiency has a big influence on the cost of production. Among the things which increase labor efficiency are size of field, (a large field giving lower costs per acre in labor) the use of horse labor and machinery wherever possible. The two-horse cultivator, the three-horse plow and the side delivery rake are examples of this. The effect of the acreage of beans on labor efficiency is well shown in Table 18. A difference of $2.63 per acre is shown between the acreages above fifteen acres and those below. There is also a marked difference in the number of man and horse hours necessary to produce an acre of beans.

Table 16

Cost of Production per Acre							
Cost	$16-20	20.01-24.00	24.01-28.00	28.01-32.00	32.01-36.00	36.01-40.00	40.00+	Average cost per acre $29.71
No. growers	1	4	5	15	10	4	1	

The Cost of Production

The cost of production can be studied more easily per acre than per bushel. The cost per bushel depends largely on the yield. Table 16 shows the cost per acre of production for forty growers. Note that the cost of production for thirty of them is between twenty-four and thirty-six dollars, the average being $29.71. The costs include rental value of the land, fertilizer and freight, manure, seed, man, horse and equipment labor, equipment costs, rental value of storage and miscellaneous costs.

Rental value of the land is charged at the rate of 5½ per cent of its value. Manure is estimated on the theory that 40 per cent of its value is used the first year and 30, 20 and 10 per cent the succeeding years. The value was estimated at one dollar a load. Man labor was charged at the rate of seventeen cents per hour, horse labor at fifteen cents and equipment labor at five cents. The rental value of the storage was estimated. The other items are self explanatory. The figures for labor, rent and manure are those used by the Farm Management Department of Cornell University.

The cost of production per bushel is given in Table 17. For most growers these figures vary from $1.50 to $2.50, the average being $2.04.

Table 17

Cost of Production per Bushel										
Cost	Less than $1.40	1.41-1.60	1.61-1.80	1.81-2.00	2.01-2.20	2.21-2.40	2.41-2.60	2.61-2.80	2.81-3.00	Over $3.00
No. growers	2	6	7	5	3	6	4	1	2	4

Average cost per bushel $2.04

Table 18

Relation between Acreage per Grower and Cost of Production per Acre

	Over 15 acres	Under 15 acres
Growers	17	23
Cost per acre	$29.21	$31.84
Horse hours per acre	52.2	56.6
Man hours per acre	33	37.1

In cases where wheat follows beans in the rotation, it is the common practice not to plow for wheat because it does well without plowing. There is much to be said in favor of charging half the cost of plowing for beans to the wheat crop.

Table 19

	Price Received per Bushel									
	2.00	2.25	2.50	2.75	3.00	3.25	3.50	3.75	4.00	4.00
No. crops Red Kidney				8	15	2	1			1*
" " Pea	4	2	1							
" " Contract	4	3								
" " Red Marrow				2	1		1			
" " Yellow Eye			1	1						
" " White Marrow					1					

* Seed

Gross Returns

Returns per acre depend on the yield, the price received, the pick and the value of the pods. The factors which determine the yield have been discussed. Table 19 shows the prices received per bushel.

Kidneys averaged $2.75 to $3.00, contract beans $2.00 to $2.25, pea beans $2.00 to $2.25.

Table 21

	Gross Returns per Acre				
Amount	0-$20.	$21.-$40	$41.-$60	$61.-$80	$81.-$100
Growers	2	19	13	4	2

Average gross returns per acre—$42.94

The amounts of pick for the growers visited is given in Table 20. Many growers believe that the charge made for picking (cleaning the crop) is a big item. The actual figures show that the amount charged for picking is 1.68 per cent of the total value of the crop.

Each grower was asked at what value he estimated his bean pods. The majority estimated $8.00 per ton. Pods are therefore credited at this price if in good condition. The average yield of pods per acre was found to be .638 tons, and at $8.00 per ton, the value of pods produced on an average acre is $5.10. Table 21 shows the gross returns per acre, the average per acre being $42.94.

Table 20

	Amounts of Pick						
Pounds	1-2	2.1-3	3.1-4	4.1-5	5.1-6	6.1-7	7
No. of crops	14	17	7	5	1	0	3

Table 22 shows the gross returns per bushel and gives the average returns when the value of pods is included and when the value of pods is not included.

Profits

The factors which affect profits are yield, price, pick and the cost of production which have already been mentioned. Profit is here figured in four different ways, profit per acre, profit per bushel, profit per horse hour and profit per man hour. The last is preferable. The best test of the success of a bean grower or the grower of any other crop is how profitable he can make every hour of labor.

The profit per man hour should be clearly understood. Profit is the balance left after every cost is charged against the crop, including all the labor. A man may get enough from his crop to pay all costs including his wages at seventeen cents per hour and still not make a profit. Many persons object to this method of figuring profit, because they believe that interest or rent and man labor should

Table 22

	Gross Returns per Bushel including Value of Pods					
Amount	Less than $2	2.-2.50	2.51-3.00	3.01-3.50	3.20	Ave. gross returns per bu. $2.95 (includ. val. pods)
Growers	3	5	9	22	1	Ave. gross ret per bu. $2.60 (not includ.val. pods)

Table 23

	Profit per Man per Hour							
Cents	Loss	1-20	21-40	41-60	61-80	81-100	100	Average profit per man per hour—38.9c
Growers	7	8	8	5	6	3	2	

not be charged. The answer is that a man does not really make a profit until his crop pays wages and interest; if he cannot make wages and interest or rent he would do better to sell his field, put the money at interest and work in his neighbor's field. He would make wages and interest and in addition be relieved of risk. The average grower in addition to all expenses made 38.9 cents for every hour of labor on the bean crop. (Table 23).

Table 24

Profit per Horse Hour								
Cents	Loss	1-20	21-40	41-60	61-80	81-100	100	Average profit per horse hour 24.8c
Growers	7	12	11	8	0	1	1	

Table 25

Profit per Bushel							
Amount	Loss	0-.50	.51-1.00	1.01-1.50	1.51-2.00	2.00	Average profit per bushel 90.7c
Growers	7	8	8	12	4	1	

Table 26

Profit per Acre								
Amount	Loss	0-$10	10.01-20	20.01-30	30.01-40	40.01-50	$50.	Average profit per acre $18.23
Growers	7	12	10	7	2	1	1	

The other three ways of figuring profit are self explanatory and are shown in Tables 24, 25 and 26. Note also that Figure 1 shows the average profit to be 44.5 per cent of the cost of production and that seven of the growers suffered a loss; that is, they did not receive a return large enough to pay all charges including interest and wages.

Progress in Bean Culture

There are many experiments which should be conducted if progess is to be made in bean growing not only in experiment stations but on the farms where beans are grown. These experiments will answer the following questions among others:

1. Is seed selection profitable? No work of importance has been done along this line.

2. What soils and rotations are best adapted to the varieties of beans and to beans in general? This question can best be answered by long time field trials under uniform conditions.

3. Is drill row, check row, or hill planting the most productive? The bean planter which can plant in check rows and hills is unknown in this section. Why not try it?

4. Does it pay to lime land for beans. Growers who have used good lime are well pleased with the results. Since the bean is a leguminous plant and has a high lime requirement, lime should be tried, especially on soils low in lime.

5. What is the best fertilizer for beans? Each grower must decide this question for his own conditions. Many of the growers have never compared two or more fertilizers for beans under similar conditions.

6. Is the use of a weeder on beans advisable? Some growers think the weeder kills too many plants; others use it regularly.

7. Does deep cultivation decrease the yield? This point should be demonstrated for the benefit of many who are not convinced.

Book Review

The Autobiography of a Farm Boy

By Isaac Phillips Roberts, Professor Emeritius and for thirty years Dean of the College of Agriculture at Cornell University. Published by J. B. Lyon Company, Albany.

Here is a book to interest the Cornell agriculturist, a story of the beginnings of his College and a revelation of the personality of the man who started it. The man tells the story of his life from a chair by the fire; conversationally, informally, as one who speaks to friends. He speaks of his father—"a dignified country squire in his high light-colored hat stored with papers, high boots and a shad-belly coat"—and of his mother—"commanding, handsome, but not beautiful, with that large benignity which comes from a well-spent, unselfish life." As he rambles in reminisence of his boyhood the reader gets rare glimpses of pioneer days in northern New York; the toil, the sport, the frugal abundance of it all; and he comes to realize that only such an environment could have produced such a man.

At twenty-one he had, by summer carpentry, won his way to graduation from the winter sessions of the Seneca Falls Academy and successfully subdued and taught for a year a district school "advanced in deviltry." Then he packed his carpenter's kit and went West, settling in the vicinity of La Porte, Indiana. Here at the end of three years of winter schoolteaching and summer carpentry, with an average wage of a dollar and a half a day, he found he had saved enough to buy a farm and marry. But those economic conditions which preceeded the outbreak of the Civil War made farming in that part of the country a task without hope. The farm was sold at a slight loss, "the two-horse wagon 'bowed,' two stout horses inspanned," and the Roberts family trekked West to settle again near Mount Pleasant, Iowa. This was in 1862 when the prairie was hard to till and harsh to live upon and when corn, the crop of the prairie brought ten cents a bushel. There may be more colorful tales, but certainly there can be none braver than the story of the uphill fight made against natural and economic adversity by these two pioneers. It was hard and it took time, but on the first of January, 1864, he says, "my wife and I took stock and found that we were out of debt and the farm was paid for." Later in the same month the house and all its contents burned up. They moved into a nearby tenant house and started again. Six years later the board of trustees of Iowa State College elected Isaac Phillips Roberts superintendent of their college, despite his lack of college education. They elected him because he had succeeded as a pioneer and as a farmr.

In 1869 the Iowa board of trustees voted a full professorship and later bestowed upon him the honorary degree of Master of Agriculture. He spent five years in Iowa, resigning in 1873 to come to Cornell, where he remained until 1905. Then he retired to his present retreat at Palo Alto, California. Concerning this thirty years of work at Cornell, Former Dean L. H. Bailey in a signed introductory statement speaks as follows:

"For thirty years Professor Roberts and his associates stood for agriculture, always for agriculture—not for a natural science under the name of agriculture nor for some pleasant combination of studies that would satisfy the law. In an eastern university, with the great tide of imigration sweeping by him to the West, with decreasing values, with old fields, with hindering traditions, he stood—stood like a prophet."

Meat Pies

BY WINIFRED MOSES, '15,

Instructor in the Department of Home Economics

IN every household there are scraps of left-over meat,—bits of chops, steaks, roasts, stews, and often quantities of soup meat. Even if one is careful to make the initial order small, there are still left-overs. Because of the small quantity of some and the lack of flavor in others, it is often seemingly difficult to utilize them in an acceptable manner. When one considers the present expenses of living, the growing scarcity of food, and the number of people who suffer from hunger, it seems essential that every scrap of food be utilized. And if one has imagination, ingenuity, and a delight in the mysteries of cooking, it is not a task, but a pleasure to change these flavorless and unappetizing looking scraps into delectable dainties.

When left-over meat is taken from the table, unless there is enough of it to serve cold, it should be freed from bones and fat and put into a jar. The bones can be put into the soup pot and the fat may be tried out, clarified, and used for various purposes. All left-over gravies and the water in which the meat is cooked should be reserved for making sauces to be used with left-over meals.

Owing to the fact that the extractives, which give meat its characteristic flavor, are soluble in water, the left-overs of the tougher pieces of meat, which are usually cooked in water to soften the tough connective tissue, are apt to be lacking in flavor. Therefore dishes made from these should be highly seasoned. The meat should be cut in small pieces, ground in a meat chopper for croquettes and diced for other dishes. It can then be heated more readily. This is desirable, for cooking meat at a high temperature tends to toughen it.

Left-over meats may be served in a variety of ways, namely, creamed on toast or in bread boxes; scalloped, in souffles, timbales, or casseroles; and prepared in chafing dishes as croquettes in salads, or in meat pies.

The meat pie is one of the easiest and best ways of serving left-over meats and one in which endless combinations can be made. If the quantity of meat on hand is large make the pie of meat, adding the other ingredients mainly for flavor. If, however, only a small quantity is available, combine with other materials and the mixture can thus be increased to the requisite amount.

Meat for meat pies may be combined with starchy foods, as rice, macaroni or spaghetti; with such vegetables as potatoes, carrots, celery, cauliflower, turnips, or mushrooms; or with the flavor vegetables, pimentoes, green peppers, tomatoes, onions, olives, pickles, or capero; or combinations of these. It may be flavored with such herbs or spices as sage, thyme, pepper, paprika, cayenne, bay leaf or sweet majoram.

The crusts served with these pies can also be varied. Ordinary biscuit crust is very often used. Bits of left-over pastry may be utilized in this way. A bean crust may be made after the following receipe:

1 cupful boiled bean pulp
½ teaspoonful salt
1 teaspoonful baking powder
1 egg beaten
2 tablespoonfuls of melted fat
Flour enough to make a soft dough

This is as easily made as biscuit crust and it lends variety to the ingredients of the pie. Plain mashed potato or a potato crust is often used. Occasionally, plain boiled rice or buttered bread crumbs can be utilized as a covering.

Perhaps one of the most important ingredients of a meat pie is the sauce.

(Continued on page 616)

THE CORNELL COUNTRYMAN

FOUNDED 1903 INCORPORATED 1914

M. C. BURRITT, Pres. J. A. VANDERSLICE, Vice-Pres. B. W. KINNE, Sec'y-Treas.

NEW YORK STATE COLLEGE OF AGRICULTURE
AT CORNELL UNIVERSITY, ITHACA, NEW YORK

Editor in Chief
J. A. VANDERSLICE

Associate Editors
P. G. DRABELLE
D. M. HINRICHS
H. S. SISSON
RUSSELL LORD
E. B. SULLIVAN
A. J. FOWLER

Business Manager
B. W. KINNE

Home Economics Editors
RUTH H. SMITH
MARIAN HESS

Circulation Manager
C. W. MOORE

Assistant Managers
P. C. CUTLER
I. B. DEWSON
W. P. CRANE
C. W. BOLGIANO
CHARLES ENNIS

SUBSCRIPTION RATES—$1.00 Payable in advance

SINGLE COPIES—25c.

ADVERTISING RATES on application

The Cornell Countryman rejects all advertisements which are in any way objectionable or likely to prove fraudulent; and so far as it can do so, assures its readers that only reliable advertisers are represented in its pages.

Entered as second class mail matter at the post office, Ithaca, N. Y., under Act of Congress, March 3, 1879

Leadership

As the world grows more densely populated and as social conditions become more complex, the demand for leaders among the people more and more exceeds the supply. There is an unparalleled need all over the land for men who are thoroughly honest, thoroughly unselfish and who are, withal, men whose capability to do things well, stamps them a superior type. Whether it be in the country or the city, this demand for leaders is keenly felt.

The best example of leadership is to be found in John R. Mott, the Cornell alumnus who has reached the pinnacle of leadership. While Mr. Mott is interested primarily in religious work, he exemplifies the leadership in society to which everyone, and especially college students, should attain.

Every college graduate should be a leader in his community. He should have those high ideals, inbred in his college career, which would make him fit for leadership and then he should have the ability and personality to impress upon his fellows the ideals for which he stands. College men are generally looked up to; they are naturally above the average. Undergraduates should look ahead and try to fit themselves for the leadership expected of them. Make use of opportunities here to make yourself worth something to your country, to your community and to yourself.

Twenty-five Years of the Babcock Test

Twenty-five years ago Stephen Moulton Babcock perfected his milk test and gave it to the world. Wisconsin, his home state, is holding a "Babcock Silver Jubilee" and all over the country men are honoring him. We desire to add a sincere word in appreciation of this

man who might have made a fortune but who preferred to make a great gift to agricultural science. Had he taken out a patent on his invention, the price of the apparatus would have risen far above the means of the man who most needs it. His unselfish gift has revolutionized dairying all over the world and made it a business and a science.

An Idea That Works

All over the country agricultural clubs are trying to help their members make more money and be better men. In Maryland there is one club more powerful than the average and more successful. As originally organized, this club was called the Gunpowder Agricultural Club, but as the members died and their sons took their places it became known as the Junior Gunpowder Club. Recently a third club has been started. Throughout all these years the organization has dominated the rural affairs of the community and been of good use. No other local institution has enjoyed a greater influence or wielded it more effectively.

Because of the success of this organization *The Countryman* is moved to tell briefly of the unique plan by which it is run, in the hope that here may be other persons to whom it might be of use. Whether the scheme be practical in all cases is for those who read with a definite community in mind to decide, but we believe that the principle is sound.

The club has no officers, no constitution, no dues. Meetings are held at the homes of the members once a month on the Saturday of the full moon. A quaint idea, this, but none the less practical. It is most easy and pleasant to drive at night when the moon is full.

In the late afternoon the members and their wives drive to the farmstead whose turn it is to entertain, and the men make a tour of inspection over the farm while the women prepare what the county papers call a "collation," but which in reality is a first-class farm dinner. After dinner the men gather in easy chairs and exchange ideas on some topic set at the previous meeting. The subject may range from "What is the Best Way to Buy Fertilizer?" to "Do We Want Latin in Our High School?" but it always has to do with practical and definite problems at hand. Later in the evening any member may bring up questions and all will try to answer them. The women are gathered somewhere else discussing something else—who knows what?—and getting just as much out of it as the men do. The masculine side of the discussion fills a column in the next issue of the county papers. Farmers all over the county turn first to this column and follow out its suggestions.

This scheme works because it provides a means toward agricultural and social excellence as simple as the farmer himself and as free from red tape. In this one community, at least, it has fostered hospitality, co-operation, farming, friendship and all the other fine arts of country life. Can you use it?

Treatment for Oat Smut

It is stated that no plant disease causes more loss each year to the farmers in certain sections of the State than does oat smut. The loss in many fields last year was reported to have been as high as twenty-five per cent. Besides the direct loss it is known that smut makes threshing excessively unpleasant. Now is the time to think about riding seed of this disease. The formaldehyde treatment will practically eradicate the smut with the cost of only a few cents per acre. Can we ask for a better, for a cheaper insurance than this? Such work as the farm bureau managers are doing is highly commendable. In many counties of the State the farm bureau managers are planning to conduct an oat smut campaign this spring. In counties where these campaigns are carried on at least two meetings will be held in each town at which time the method of treating the oats will be demonstrated.

Farm Practice and the Farmer's Attitude

One of the greatest if not the greatest problem that confronts the College of Agriculture today, is how to bring the confidence of its graduates before the agricultural public. Reports from men in the various departments of the College show that the average farmer has too little faith in the college man. Those students who are planning to work this summer to gain agricultural experience, especially those who are getting experience through the Department of Farm Practice, should do their best to remedy this condition. Such students have a special opportunity to influence the attitude of the farmers toward the value of college men's services. Although there may be an excuse for lack of quality on the part of the student's work there is no reason for lack of quantity.

Campus Notes

Agricultural Association Elects Officers for Year

J. C. Corwith, '16, was elected president of the Agricultural Association at the semi-annual elections held February 29. P. R. Chappell, '17, was elected vice-president; Miss M. S. Albertson, '17, secretary; and C. B. Loudenslager, '17, athletic director.

Fifteen "Ag" Students in Recent Track Meet

Of the 36 men from the Varsity track squad, who were selected by Coach Moakley to compete at the indoor meet of the I. C. A. A. A. A., held at Madison Square Garden, March 4, fifteen were students in the College of Agriculture. These entries were as follows: M. G. Cheney, '16; J. C. Corwith, '16; L. E. Gubb, '16; A. H. Main, '16; H. Millard, '16; R. J. Moore, '16; G. M. Taylor, '16; W. C. Bartsch, '17; F. G. Burke, '17; W. D. Crim, '17; A. W. Richards, '17; L. V. Windnagle, '17; A. F. Van Winkle, '17; A. B. Kelly, '18; J. M. Watt, '19. Of these men Richards won first place in both the high and broad jump and second place in the shotput. Burke came in second in the 24-lap team race, followed by Corwith as third. Gubb took third place in the high hurdles.

Babcock Warns N. Y. Farmers on Alfalfa Seed

H. E. Babcock, Assistant State Leader of Farm Bureaus, made a special visit to South Dakota and Minnesota during the past winter for the purpose of investigating conditions of the alfalfa seed supply. From Mr. Babcock's report and from the reports of others who made trips through other northwestern states indications are that these states produced not over ten per cent of the normal supply. Mr. Babcock has this to say, "Information indicates that farmers should be extremely careful in purchasing alfalfa seed for use next spring. Unless one can be absolutely sure of purchasing northwestern grown seed, we believe it would be better to defer sowing until good hardy northwestern seed can be secured."

Christian Association Holds Campaign

The Cornell University Christian Association held a five-day campaign among the faculty and undergraduates of the University from March 9 to 13. This campaign was carried on with a two-fold purpose: to unite the religious interests at work among the students, and to deepen their religious life and acquaint them with the development and progress of Christianity throughout the world. Fifty men prominent throughout the country assisted in the campaign by speaking in the various fraternities and clubs "on the hill." Cornell's famous alumnus, John R. Mott, '88, director of the World's Student Christian Federation, was the leader of the campaign. He gave six addresses in Bailey Hall.

University Herd Has 34-Pound Cow

Glista Coreva, one of the Holsteins owned by the College, made a record of 34.52 pounds butter February 12-18. This record, which was supervised by an official from the Massachusetts Experiment Station, is the highest ever made at the College. Glista Coreva has seven half sisters, all of which were bred at the College and five of which have records from 30 to 32 pounds butter production in seven days. It is thought that the sire of these cows, Prince Ybma Spofford 6th, has a higher per cent of daughters with records above 30 pounds butter production for a week, than any other sire in the world.

A Poultry Market Chart

There is placed between the main stairways on the first floor of the Poultry Building a chart upon which the poultry market quotations are being recorded each day. The records date back to January 1, 1912. Some interesting facts become evident by the comparison of records displayed. Upon studying this chart the first thing noticed is the remarkable uniformity in the price of eggs for analogous months during each of the four years. In general, prices reached their lowest point during the month of April and their highest during November. It is also interesting to note that while on April 1, 1913, eggs reached the lowest price recorded during the four years, twenty-one cents, that on November 12, the same year they reached the highest price recorded, sixty-five cents. This chart enables one to predict poultry market prices with considerable accuracy.

To Enlarge Student Loan Fund

The Students' Loan Committee of the College of Agriculture has initiated a campaign among the undergraduate body of the College for funds sufficient to raise the amount available for needy students to a total of five thousand dollars. The Student Loan Fund was started two years ago with a thousand dollars. Since then this sum has dwindled to $326. It is stated that forty-one students are now in need of aid. Subscriptions to the fund may be made to any of the following: E. P. Schlicter, '16, H. L. Adams, '17, F. P. Cullinan, '17, A. D. Fonda, '17, M. S. Clement, '18, E. Grimes, '18, Miss M. M. Selden, '19, F. C. Wilbur, '18, A. A. Baker, '19 and F. J. Hopkins, '19.

MISCELLANEOUS NOTES

The following men are out for the agricultural crew: C. H. Lynch, 17; F. A. Kennedy, '18; C. A. Shafer, '19; H. G. Schmidt, '19; G. H. Stanton, '19; G. A. Tavares, '19.

The College of Agriculture won the intercollege basket ball title this year without losing a game. The team was composed of the following: J. E. Houck, '17, captain; H. J. Karr, '18; W. Palmer, '18; S. J. Schwartz, '18; J. B. Wilson, '19.

On Wednesday evening, March 8, Warwick S. Carpenter, Secretary of the New York State Conservation Commission, spoke in Roberts Hall. His lecture, which was illustrated with motion pictures, dealt specially with fish and game on State forest lands.

C. P. Alexander, '13, of the department of Entomology, recently spoke to the Jugatae Society on "The Cruise of the Ecphora," the geological expedition taken last summer under the direction of Professor G. D. Harris, '86, of the Department of Paleontology and Stratigraphic Geology.

On the afternoon of Monday, March 13, Elbert W. Baker, publisher of the *Cleveland Plain-Dealer,* spoke informally to the members of the *Country-*

man board and a few invited guests. Mr. Baker told of the farm which he operates at Gates Mill, Ohio, and of the country life projects of the community in which he has a part. He declared his belief in the college-trained farmer and in the moving force of cooperation. Above all, he emphasized the conviction that "honesty is the best policy" and cited as an example the growth of the *Plain-Dealer* under his eighteen years of management.

The 'Varsity Wrestling Team won its fourth straight victory and second perfect score by defeating Lehigh in the last dual meet of the season on March 11.

Donald Bain Vail, of Ridgewood, New Jersey, a junior in the College of Agriculture has been elected editor-in-chief of the *Cornell Sun*.

H. W. Peters, '14, has resigned from his positon as secretary of the University to accept a position with the Packard Motor Car Co. of Detroit. Peters was appointed secretary in his senior year and has been in that capacity ever since.

On the afternoon of March 13 Jugatae met in Room 392 of Robert's Hall and heard papers read by Mr. R. C. Smith and Mr. J. S. Gutsell, of the Department of Entomology. Mr. Smith's subject was "Insects in Relation to Health and Sanitation, as Shown by a Study of an Ohio County" and Mr. Gutsell spoke on "The Fish Culture Survey of a Stream."

"The Spirit of Audubon," a motion picture of bird life featured the meeting of the Cayuga Bird Club, held on the evening of March 1 in Roberts Assembly. Incidental pictures of bird life were shown by Mr. H. K. Job, an international expert on such topics.

One hundred and thirty undergraduates have been dropped from the University because of deficiency in first term work. This is a decrease of fourteen from the number "busted" last year. Agriculture was second losing 26 this year as compared to 47 last year. The College of Arts and Sciences dropped 41 undergraduates, the same number as last year.

On March 6, 7 and 8 Professor H. E. Ross of the Dairy Department held meetings in Erie County with W. L. Markham, who is farm bureau manager of the county. Meetings were held at Springfield, Chaffee and Hamburg where such subjects were discussed as regards the care and handling of milk and the disposal of other dairy products.

H. E. Ross, Professor of Dairy Industry and T. J. McInerney, instructor in dairy industry have recently edited the Cornell bulletin on "Methods of Cooling Milk."

Professor C. G. Bradley of the Department of Entomology has arranged to carry on his work here during the first and third terms rather than, as usual, during the first and second terms. He is spending his second term at the Academy of Natural Sciences, in Philadelphia, where he is taking up special work.

Professor A. W. Gilbert, '05, of the plant breeding department will spend the summer at the Graduate School of Agriculture at Amherst. The work there will be given under the auspices of the Association of American Agricultural Colleges, its purpose being the study of recent development in national, social, and economic sciences as applied to agriculture.

The second Annual Good Roads Week was held at Ithaca during the week of February 21, the College of Civil Engineering, the Federal Office of Public Roads, and the New York State Highway Department cooperating. The fifty-one lectures were attended by

more than three hundred visiting engineers and contractors. Interest in this movement is so high that this convention, which was temporarily inaugurated last year, has been made into an annual institution.

Recent extensions and improvements to the Home Economics cafeteria have increased its capacity from 550 to 700. Extensions have been made on the east and west ends and the east wing has been arranged so it may be used for private banquets, luncheons and similar private affairs. It is also under consideration as a possible place for 'varsity training table.

R. G. Bird '16 has been elected president of the Forestry Club. The other officers are: G. M. Taylor '17, vice-president; A. A. Manchester '17, secretary; H. O. Johnson '17, treasurer. Plans are under way for the publication of a Forestry Club "Annual."

The State Commissioner of Agriculture recently called upon the dairy department to formulate a law for licensing milk testers. The purpose of such a law is to protect the dairymen against inaccurate testing by inexperienced men, and was first approved at a conference recently held in Albany. It is expected that a bill covering this matter will be introduced at the present session. Professor W. A. Stocking went to Albany March 16 to hold a conference with the Commissioner of Agriculture in regard to this matter.

With the additional greenhouse area allotted to the vegetable gardening department, making an approximate total of 16,000 square feet, a number of experiments have been started, the result of which it is believed will be of considerable value, not only to the student, but also to the commercial greenhouse man. One of these experiments is a combination variety and spacing test with tomatoes, the object of which is to find what spacings give maximum returns per unit area and also to try out some of the leading varieties. It is planned to follow this work up by some breeding work in the endeavor to develop a variety of tomatoes which will be better adapted to greenhouse culture than the present varieties. Cucumber plants are being grown in a training experiment, the object of which is to find which method gives the maximum yield per unit area and which produces the earliest crop. The department has also started on a small scale breeding work with greenhouse lettuce with the aim of developing a better variety of leaf lettuce for greenhouse culture.

Miss Miriam Birdseye of the Extension Department conducted an Extension School in Home Economics at Lowville, N. Y., from March 6 to 10.

The annual "Night School" in Home Economics began Monday, March 6, with a registration of forty women in advanced cookery and eight in sewing.

Following is the program for "The Eight Weeks Club" which meets every Friday afternoon in Barnes Hall:

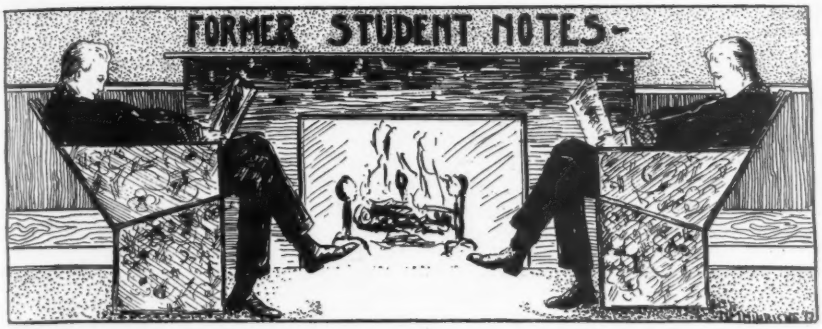
April 14—"Flowers"—Miss Minns.

April 21—"Service"—Discussion.

April 23—"What the State is doing for Country Girls"—Miss Van Rensselaer.

May 13—"Week-end and House-party Guests"—Miss Anna Clark, County Secretary.

May 15—"With Birds"—Professor Allen.



'81, B. S. Agr.—On January 15 delegates from a number of scientific societies met in Washington to arrange for a memorial to the late Doctor Joseph A. Holmes. The memorial has been proposed with a view toward advancing those ideals which Doctor Holmes held in regard to increased safety for mining and metallurgical workers and for the conservation of the mineral and natural resources of the United States.

'82, B. S.—Harvey B. Jones may be reached at 930 St. Nicholas Avenue, New York City. For twenty-two years he has been custom's inspector of the port of New York, and in addition he has supervised a farm in Delaware County.

'97, B. S.—Louis Agassiz Fuertes, of Ithaca, recently lectured in Detroit before the Institute of Science and the Detroit Athletic Club. It was hoped that a contemporaneous exhibition of Mr. Fuertes' paintings might be held at the Detroit Art Museum, but he had already arranged for an exhibition of his whole collection in the Arnot Art Gallery, at Elmira. A recent number of *Bird-Lore* remarks that "the Smithsonian Institutes pays Mr. Fuertes a well-deserved compliment in asking permission to republish his series of *Impressions of the Voices of Tropical Birds.*"

'99, Sp.—Edgar Salinger is living on his 200 acre farm at Brewster. He has 80 acres in fruit trees, but is specializing in poultry, keeping a flock of 1800 single comb white leghorns and marketing eggs by parcel post in five-dozen lots.

'00, Ph. D.—Kary C. Davis on leaving Cornell went to Durum County, Wisconsin, where he became principal of the first country life school in America. Later he returned to New York to assume the duties of Dean of the State School of Agriculture at Canton, and from there went to the New Jersey College of Agriculture, where he directed the short courses and was professor of agronomy. He is now head of the agricultural department of the Knapp School of Country Life, Peabody College, Nashville, Tennessee. His duties there include general supervision of the school farm, which maintains herds of dairy Shorthorn and Holstein cattle, Duroc-Jersey swine, and Percheron horses. In addition to his teaching, Doctor Davis has found time to do outside work along educational lines. He is editor of the Lippincott Farm Manual series of agricultural text books.

'00, B. S.—John Ihlder has resigned the office of field secretary of the National Housing Association to become secretary of the Ellen Wilson Holmes Company, a five per cent limited dividend corporation organized to build dwellings for the wage earners of Washington, D. C. This is a phase of housing work in which he has specialized for the last three years and he now proposes to give most of his time to it.

'05, W. C.—Arthur L. Cook is engaged

in diversified farming at Cincinnatus. He is specializing in dairy work and has a herd of pure bred and high grade Holstein cows, which gave an average of ten thousand pounds of milk last year. In 1906 Mr. Cook was married to Miss Vera A. Foster, of Cincinnatus. The couple have three children.

'05, W. C.—C. E. Greene is farming at Greene. He raises pure-bred Jerseys.

'09, M. S. A.—Doctor Jacob Taubenhaus, associate plant pathologist of the Delaware Agricultural Experiment Station, has accepted an appointment as head plant pathologist and physiologist at the Texas Agricultural Experiment Station. Doctor Taubenhaus recently delivered the John Lewis Russell lecture before the Massachusetts Horticultural Society, speaking on "Diseases of Sweet Peas."

'09, W. C.—Since his marriage in 1912, E. L. Chapman has been farming near Albion. His chief crops have been wheat and red kidney beans, with yields of 45 and 18 bushels per acre respectively. He also grows apples and fattens steers.

'10, B. S. A.—B. D. Gilbert is extension representative in charge of the Lackawanna County Farm Bureau at Clark's Summit, Pennsylvania.

'11, B. S.—Willis Corwin is teaching agriculture in northern Minnesota.

'11, B. S.—Lewis H. Schwartz is father of a baby girl, Martha Jane, born August 15, 1915. He is teaching in the department of poultry husbandry at Purdue University, Lafayette, Indiana.

'14, M. S. A.—M. V. Barnes is principal of the school at Bethlehem, New Hampshire.

'10-'11, Sp.—In the issue of February 6 of the *Knickerbocker Press*, published *at Albany*, there appeared an article on the success of the Herkimer County Farm Bureau. This article concludes with the following personal sketch of the farm bureau manager, Mr. Charles A. Taylor:

"He has been manager just a year, but he is already a prime friend of the farmers and his influence is felt throughout the county. Taylor is a short, sturdily built man with just a trace of gray on his temples. He is a tireless worker.

"He is a native of Norwich, where his father was superintendent of a chair factory. As a boy he was raised on a farm near McLean, and when he was seventeen years old he took over the entire management of the farm from his father. But Taylor decided to complete his education, and so finished his course in the McLean High School and entered Cortland Normal College. After finishing his course at Cortland Normal, Taylor entered the State College of Agriculture at Cornell University. He likes to tell how he began life at Cortland with $36.16 and still had the sixteen cents when he left Cornell six years later. During this time he was entirely dependent on his own efforts, paying the greater part of his expenses by the photographic work he did for the different departments of the university. Leaving Cornell, he organized the agricultural department in the high school at Hancock, remaining there three years until he went to Herkimer.

"Mr. Taylor was married in 1912 to Louise Ferris of Groton. They have two children, Charles A., Jr., born in 1913, and Florence Louise, born last summer."

(Continued on page 604)

Former Student Notes

(Continued from page 602)

'12, Sp.—Frank W. Beneway is managing the Wile-Alder Fruit Farms at Ontario on a profit sharing basis. He writes as follows:

"We are trying to establish a brand of fruit with the farm title. Although our main crop is apples, we grew last season twenty tons of cabbage to the acre, sixty bushels of potatoes, eighty of oats and a fair crop of wheat. Our peaches, however, were a loss. We are conducting some experiments on nut trees."

'13, B. S.—M. B. Goff is managing the Guern-Weal Farm at Sturgeon Bay, Wisconsin. He has a son, Charles Davis Goff, born May 31, 1915.

'13, B. S.—Duane W. Hadsell is at Orlando, Florida, managing orange groves for a New England concern. He spent the year after his graduation studying methods of fruit growing in Oregon and Washington. He is one of the editorial staff of the *Florida Grower*.

'13, B. S.—Bruce P. Jones, a former business manager of the *Countryman*, is now with the college department of the Macmillan Company, Publishers, having charge of the agricultural publications of that department. His work necessitates visiting all the agricultural colleges of the country at least once a year. His headquarters are at 64-66 Fifth Avenue, New York City.

'14, B. S.—W. H. Bullock is associate editor of the *American Agriculturist*. His address is 315 Fourth Avenue, New York City.

'14, B. S.—Albert T. Combe, jr., is representing the Standard Oil Company at Soerabaya, Java. His territory extends from Singapore to New Guinea and from Borneo to Australia. He writes that things were not so bad in the early part of the year 1915, as eighty per cent of the American population of Soerabaya were Cornell men. These Americans were Herbert Bertel '10, A. W. Hart '12, and A. W. Loudon, a graduate of Yale.

(Continued on page 606)

Former Student Notes

(Continued from page 604)

'14, B. S.—Richard T. Cotton recently sailed for Porto Rico, where he is to be employed as an entomologist in the government service. Mr. Cotton has been a graduate student at Cornell since September, 1914.

'14, B. S.—P. C. King, dean and director of the school of agriculture at Nganching, China, has been appointed forester by the governor of Ngan-Hwei Province.

'14, B. S.—J. E. McGolrick is in the real estate business with his brother, Paul A. McGolrick, at 261 Broadway, New York.

'14, Sp.—D. Burt Smith is about to take possession of a forty-acre fruit farm, situated two and a half miles east of Fredonia, on the main road to Buffalo.

'15, W. C.—James T. Streeter's address is South Coventry, Connecticut, where he is managing a 400-acre farm. He writes that he is working with seventy Guernseys and expects to build up a pure-bred herd.

'14, B. S.—J. S. Woolen is farming in Anne Arundel County, Maryland. His address is Lothian.

'14, B. S.—C. C. Woolston is engaged in farming with his father at Pittsford.

'15, W. P. C.—Samuel G. Kroneck is working on a dairy farm at Frankfort.

'15, B. S.—C. E. Cornwell is with the American Telephone and Telegraph Company, 24 Walker Street, New York.

'15, B. S.—J. Richard Dorn is in the wholesale wine business at 408-426 Water Street, Sandusky, Ohio.

'15, B. S.—Robert Dean Edwards has left the University of Wisconsin and has entered the graduate school of the University of Illinois.

(Continued on page 610)

Former Student Notes

(Continued from page 606)

'15, B. S.—Mrs. G. Albert Mays, of Glencoe, Maryland, has announced the engagement of her daughter, Marion, to Arlyn W. Coffin of South Somerville, New Jersey. The wedding will take place in the early summer. Since his graduation Coffin has been teaching agriculture and science at the Agricultural High School, Sparks, Maryland.

'15, B. S.—G. L. Fuller, who has been with the soils department at Cornell, is now managing the George A. Fuller Estate.

'15, B. S.—H. S. Gabriel is teacher of agriculture in the high school at Greene.

'15, B. S.—A. W. Gibson is instructing in the Department of Farm Practice.

'15, B. S.—W. J. Hall is farming near Canandaigua.

'15, B. S.—John Kruesi has left Schenectady and entered the sales department of the Detroit Edison Company at Detroit.

'15, B. S.—Howard Lynch was married to Miss Josie Adelaide Poyer, of Marlboro, on January 22. Mr. Lynch was attended by William Creifelds, jr., '15, and the ushers were C. F. Neergaard '15 and T. T. Newbold '14. Mr. and Mrs. Lynch will make their home in Brooklyn.

'15, B. S.—A. S. Montague is enrolled in the law school of the University of Michigan.

'15, B. S.—J. S. B. Pratt, jr., is assistant agriculturist at the Hawaiian Sugar Planters' Experiment Station, Honolulu. His address is Box 686, Honolulu.

'15, B. S.—C. H. Reader is living at 238 Fort Washington Avenue, New York City. He is research assistant in the Department of Health of the City of New York.

(Continued on page 616)

Throbbing with life, glowing with color, Columbia orchestral records are triumphs of tone-production. In *truth* and brilliance, timbre and feeling, they represent the quality of all

COLUMBIA DOUBLE-DISC RECORDS

Whatever class of music you prefer: vocal, instrumental; solo, ensemble; concert, operatic, dance, orchestral, you get splendid, rich, *natural* reproductions on Columbia Double-Disc Records. They will play—*perfectly*—on your machine. You can get them—*everywhere*—at Columbia dealers'. Listen to them *today*. "Hearing is Believing."

New Columbia Records on sale the 20th of every month.

Former Student Notes

(Continued from page 610)

'15, Grad.—A. M. Ritchie, Carnegie Fellow of the Imperial Bureau of Entomology, who was registered in the Department of Entomology of this college, is now imperial entomologist of Jamaica.

'15, B. S.—B. H. Stasch, who was in the dairy business in Vermont, has returned to Ithaca where he intends to enter horticultural and vegetable gardening work.

Meat Pies

(Continued from page 593)

The usual way is to use the left-over gravy as a sauce to mix with the meat and other ingredients, but many other sauces may be used. The simplest sauce is the plain white or velocité sauce, made by melting one tablespoonful of butter, stirring into this one tablespoonful of flour and gradually adding either one cupful of milk, or one cupful of stock. If the butter and flour are browned before the liquid is added, we have a brown sauce. If we use tomato juice for liquid, we have a tomato sauce. The addition of pimento makes a pimento sauce. These sauces may be varied by the addition of chopped pepper, mushrooms, celery, oysters, pickles, capero, or eggs.

The general rule for making a meat pie is to dice the meat and the vegetables. If these are to be combined with the meat, mix with plenty of sauce, put into a buttered baking dish, add the crust and bake until crust is done. If raw vegetables are to be used, dice them and mix them with stock or sauce, the flavor herbs or spices, and cook on top of the stove until nearly done. Add the diced meat, which has been seasoned, transfer to a buttered baking dish, put on the crust and bake.

A meat pie may be served in a large dish, but it is more attractive when served in individual casseroles or rumekins.

SPRAYING

Insures Perfect Fruit and Vegetables

We sell **Sprayers** for everybody—Hand, Traction and Gasoline Engine machines. Call and look over our line and secure **FREE** copy of **handsome** Spray Book.

Watson 4-Row Potato Sprayer

for wide or narrow rows. Spray as fast as you can drive. Power always strong. **Automatic Agitation** of liquid and **cleaning** of strainers. Two nozzles to each row for thoroughly saturating foliage both top and bottom.

Fig. 1500

The Empire King

Fig. 180

leads everything of its kind. Throws fine, misty spray with strong force. **No clogging.** Strainers are **brushed and kept clean** and liquid is **thoroughly agitated** automatically. Corrosion is impossible.

Can be easily moved about. Adapted for spraying fruit and vegetables, also whitewash.

Can be furnished on different size casks and also fitted for spraying 4 rows of potatoes.

The Leader Orchard Sprayers

are typical modern machines for large spraying operations. Combination mounted outfits, consisting of gasoline engine, spray tank, pump, platforms, spraying appliances, all complete and ready for work. Engines adapted for other power work.

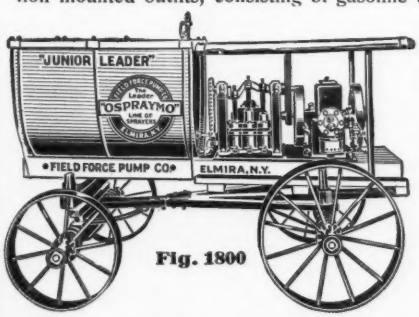


Fig. 1800

Insist on this Trade Mark

FIELD FORCE PUMP CO. The Leader "OSPRAYMO" LINE OF SPRAYERS ELMIRA, N.Y.

FIELD FORCE PUMP CO., Elmira, N. Y., Mfrs.

The Crops of Ceylon

(Continued from Page 581)

where labor is so cheap as it is at Ceylon it can be done with comparatively little cost.

One of the most recently introduced crops in Ceylon is rubber. The introduction and successful cultivation of this is due largely to the efforts of Dr. J. C. Willis, who was for a number of years director of the Botanical Gardens at Peradeniya. Dr. Willis began his experiments with the seed of the rubber plant in 1897. Setting out plants in one of the botanic gardens of the island, it was soon found that an annual return of one hundred pounds or more of rubber per acre might be expected. About this time Dr. Willis made a discovery which more or less revolutionized the production of rubber, namely, that if a tree is tapped for rubber, and then ten days later is tapped in the same spot, the yield of rubber is about twice as large. Tapping is done by means of V-shaped cuts in the tree made about six or seven feet above the ground. The sap, or milk, runs down these cuts, and is collected in tins and brought into factories, where it is coagulated, or clotted. It is then ready for export.

The rubber industry of the Tropics has grown to enormous proportions in the last ten or fifteen years. There are in the neighborhood of 200,000 acres planted to rubber in Ceylon alone. Although the prices are not so great as in former years, the profits are still very satisfactory.

In walking about through the beautiful, narrow lanes everywhere found in Ceylon, over the mountains, and through the hills, one frequently comes upon small, picturesque huts in which the natives live. It is not uncommon to find spread out on the ground, but protected from the ground by a large palm leaf, quantities of seeds of the cacao, from which our cocoa is made. While there are some plantations of cacao of considerable size, the industry after all is a sort of family affair, each family seeming to be able to procure the fruits from the roadways and

(Continued on page 622)

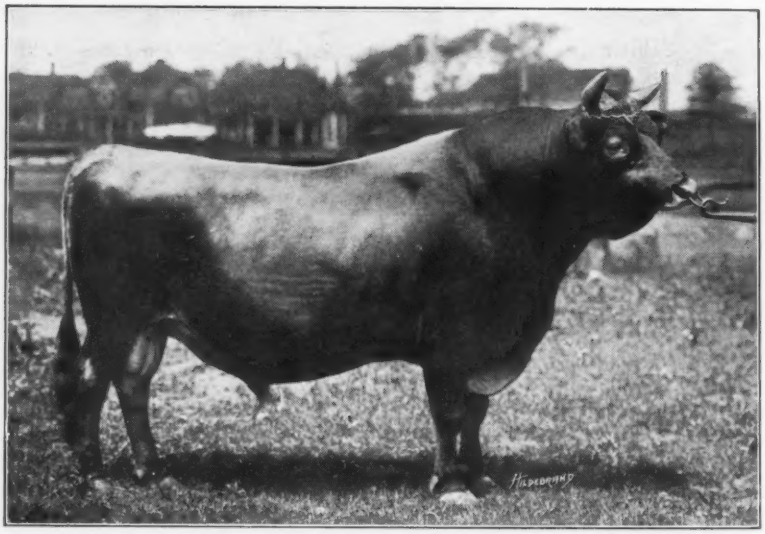
The Crops of Ceylon

(Continued from page 620)

jungles, and to save and have ready for market a certain quantity of the bean-like seeds.

The jungles, of course, are filled with many kinds of tropical fruits which at all times furnish plenty of food for the natives. The jak fruit is found everywhere, sometimes growing two feet in length and weighing from forty to fifty pounds. The jak is to the natives of Ceylon what the cabbage is to our southern Negro population—the standard vegetable product. Mangoes, camphor, bamboos of many kinds, cinnamon, coffee, bananas and plantains are found everywhere.

Nearly all the natives in these regions, including those from the Straits Settlements, Siam, Burma, Ceylon, Java, Sumatra, and the adjacent islands, are addicted to the use of the betel nut. The nut is obtained from the Areca palm. It is cut into thin slices, mixed with a little lime, sometimes sprinkled with spice, and wrapped in a betel leaf, and the whole is chewed like tobacco. The saliva is colored a blood red, and the teeth and lips of the natives show the marks of this rather disgusting habit. All along the roadsides one may notice, about four or five feet from the ground, on telegraph and telephone poles and trunks of palms and other trees, white finger prints. These are the marks left by the natives after they have prepared their betel nuts for chewing. The native always has a small quantity of lime left on his fingers, and he uses the nearest post or tree trunk as a cleansing agent. It is said that the use of the betel nut is conducive to health, as the lime serves a useful purpose in preventing a number of tropical diseases.



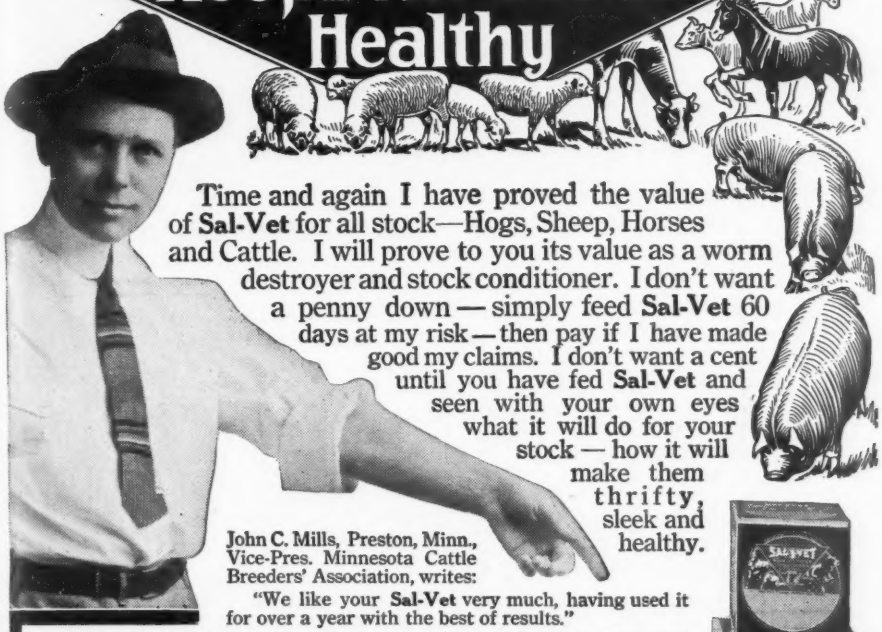
The Jersey Bull, Julia's Majesty

OWNED BY GEORGE BATTEN, MONTCLAIR, N. J.
AN IDEAL DAIRY HERD SIRE.

Note the great length of back, clean withers, deep barrel, and rugged constitution. Your herd needs such a sire. He will improve the type and increase its production. The American Jersey Cattle Club, 397 W. 23rd St., New York City, has helped thousands of dairymen secure increased profits. Their free book, "The Story of the Jersey" will interest you in the *right* breed. Write today for your copy.

Where you saw it will help you, them and us

Keeps All Stock Healthy



Time and again I have proved the value of **Sal-Vet** for all stock—Hogs, Sheep, Horses and Cattle. I will prove to you its value as a worm destroyer and stock conditioner. I don't want a penny down — simply feed **Sal-Vet** 60 days at my risk — then pay if I have made good my claims. I don't want a cent until you have fed **Sal-Vet** and seen with your own eyes what it will do for your stock — how it will make them thrifty, sleek and healthy.

John C. Mills, Preston, Minn., Vice-Pres. Minnesota Cattle Breeders' Association, writes:

"We like your **Sal-Vet** very much, having used it for over a year with the best of results."

A. H. Nokes, Springfield, Ill., Treas. of the Holstein-Friesian Breeders' Association of Illinois, says:

"Will say that we like **Sal-Vet** fine. It is just the thing to keep stock in fine, thrifty condition. This has been our experience with it."

The Great Worm Destroyer **SAL-VET** ***The Great Live Stock Conditioner***

—is not a feed, but a medicated salt that rids all farm animals of blood-sucking, disease-breeding worms—makes stock thrive faster, look better, act better. Animals in healthy condition are much less liable to disease, than when "worm-ridden" and run-down. Try **Sal-Vet** at my risk—let me prove it's value on your stock.

Send No Money—Just the Coupon

Tell me how many head of stock you have, and I'll ship you enough **Sal-Vet** to last them 60 days. You simply pay the freight charges when it arrives and feed it according to directions. If it does not do as I claim and you make a specific report in 60 days, I'll cancel the charge—you won't owe me a penny. Address

SIDNEY R. FEIL, President **THE FEIL MFG. CO., Chemists** Dept. 29 **Cleveland, O.**

Sidney R. Feil, President, THE FEIL MFG. CO., Dept. 29-4-16 CLEVELAND, OHIO

Ship me enough SAL-VET to last my stock 60 days. I agree to pay the freight charges and if I feed it according to directions, and it fails to do as you claim, I report them fully in 60 days, you are to cancel the charge and I will owe you nothing.

I have.....cattle.....sheep

.....horses.....hogs.....

Name.....

P. O.....

Ship Sta.....

State.....

[204]

LOOK FOR THIS LABEL on all SAL-VET Packages. Don't be deceived by imitations.

Don't buy "Sal" this or "Sal" that. Get the original genuine **SAL-VET.**

PRICES

40 pounds	$ 2.25
100 pounds	5.00
200 pounds	9.00
300 pounds	13.00
500 pounds	21.12

No orders filed for less than 40 lbs. on this 60 day trial offer. Never sold by peddlers nor in bulk; only in Trade-Marked SAL-VET packages. Shipments for 60 days' trial are based on 1 lb. of SAL-VET for each sheep or hog, and 4 lbs. for each horse or head of cattle, as near as we can come without breaking regular sized packages.

MADE FOR THE

B.V.D.

BEST RETAIL TRADE

(Trade Mark Reg. U. S. Pat. Off. and Foreign Countries)

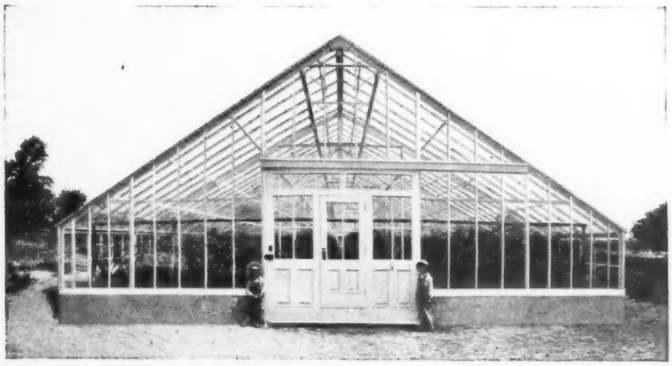
THIS world-known label on Summer Underwear is the Sign-Post on the Road to Comfort that guides you straight to Money's Most.

If it hasn't the Red Woven Label shown above, it isn't B.V.D. *Underwear.*

B.V.D. Closed Crotch Union Suits *(Pat. U. S. A.)*, $1. and upward the suit. B.V.D. Coat Cut Undershirts and Knee Length Drawers, 50c. and upward the garment.

The
B. V. D. COMPANY,
NEW YORK.

London Selling Agency:
66, Aldermanbury, E. C.



HOW TO OVERCOME OFF-SEASON LOSSES

THE really progressive farmer of today is not content to show a profit on his investment half the year and let it lie idle the other half. He realizes that the only way to insure himself of a *real* income is to farm all the year round. So he farms *intensively* under glass, as well as *extensively* on his outdoor acres.

Off-seasons cut into profits. You can do away with off-seasons by raising lettuce, tomatoes, cucumbers or flowers under glass during the otherwise idle months. You will find a ready market that will net you a good snug profit year after year.

It is not necessary to go into this thing on a large scale at first. You can start in with one of our smaller greenhouses. And when you begin to see what substantial results you get from intensive month-in-and-month-out farming, it will be an easy matter to add to your initial structure.

We have been making greenhouses —the practical, enduring kind—for over quarter of a century.

Let us take up this intensive farming question with you.

Send for our commercial greenhouse catalog.

Hitchings and Company

General Offices and Factory
ELIZABETH, N. J.

New York
1170 Broadway

Boston
49 Federal Street

Philadelphia
40 So. 15th Street

Easily Filled

Easily Turned

Good News for Farm Women

A wonderful new separator has been invented that will make your work a great deal easier. The old-style separator has always insisted on being turned at regulation speed, whether you were well or ill, rested or tired.

A slight slowing of speed in turning the handle meant a loss of cream—and money. One's attention had to be strictly on turning the crank at an unvarying high speed which was trying to both mind and strengh.

But, this new Suction-feed Separator *meets your moods.* Its speed is your speed, and yet it skims absolutely clean at all times. The

SHARPLES
SUCTION-FEED
CREAM SEPARATOR

draws up into the bowl just the right quantity of milk — always in exact proportion to the separating force. If you feel out of sorts, you may turn slowly; if you feel spry, turn as fast as you please and the bowl will take up more milk. Fast or slow, the cream will be of the same thickness.

The knee-high supply can does away with the hard, high lift no woman should be asked to endure day after day. The Sharples bowl has only three pieces to clean, not one heavy, bulky, or fussy—and no discs. And, there are many other exclusive features.

Drop us a postal and we will send you our new book, "Velvet" for Dairymen. It tells all about the Suction-feed Separator and explains our liberal free trial offer. Write at once to Dept. 70.

THE SHARPLES SEPARATOR COMPANY

Also Sharples Milkers and Gasoline Engines

West Chester, Pennsylvania

Chicago **San Francisco** **Portland** **Toronto**

THE ATKINSON PRESS, ITHACA